AMERICAN ARTISAN

AIR CONTROL

FIRST AGAIN!

New Perimeter Return Air Grille

NO. 186 RETURN AIR GRILLE

NO. 180 DIFFUSER

Matches the Famous No. 180 Baseboard Diffuser

BETTER PERIMETER INSTALLATIONS!

Here's another good reason why you're always ahead with Air Control! It's the new No. 186 Perimeter Return Air Grille — superbly-styled companion to the long-time favorite No. 180 Baseboard Diffuser. Now, you can make perfectly matched installations — at a big savings in time and cost! This new Return Air Grille requires no stack head and eliminates the need for cutting an opening into the wall Bottom has time-saving knock-out sections for duct and installs on rough or finish floors, either before or after plastering. Face hooks quickly into position and double row of openings provide a full 59 square inches of free area in each 4-foot section. Save with Air Control No. 180 Baseboard Diffusers and No. 186 Return Air Grilles on all perimeter installations — it's a combination that can't be beat! Your jobber can supply you

There's an Air Control grille, register or diffuser to meet every heating and cooling requirement. Send in today for your free copy of this complete catalog.

Leave it to the ladies — they'll choose Air Control every time, because the smart, trim lines of these diffusers and grilles harmonize with any room interior. Perfectly matched, clean, quiet, the most in satisfaction.

AIR CONTROL

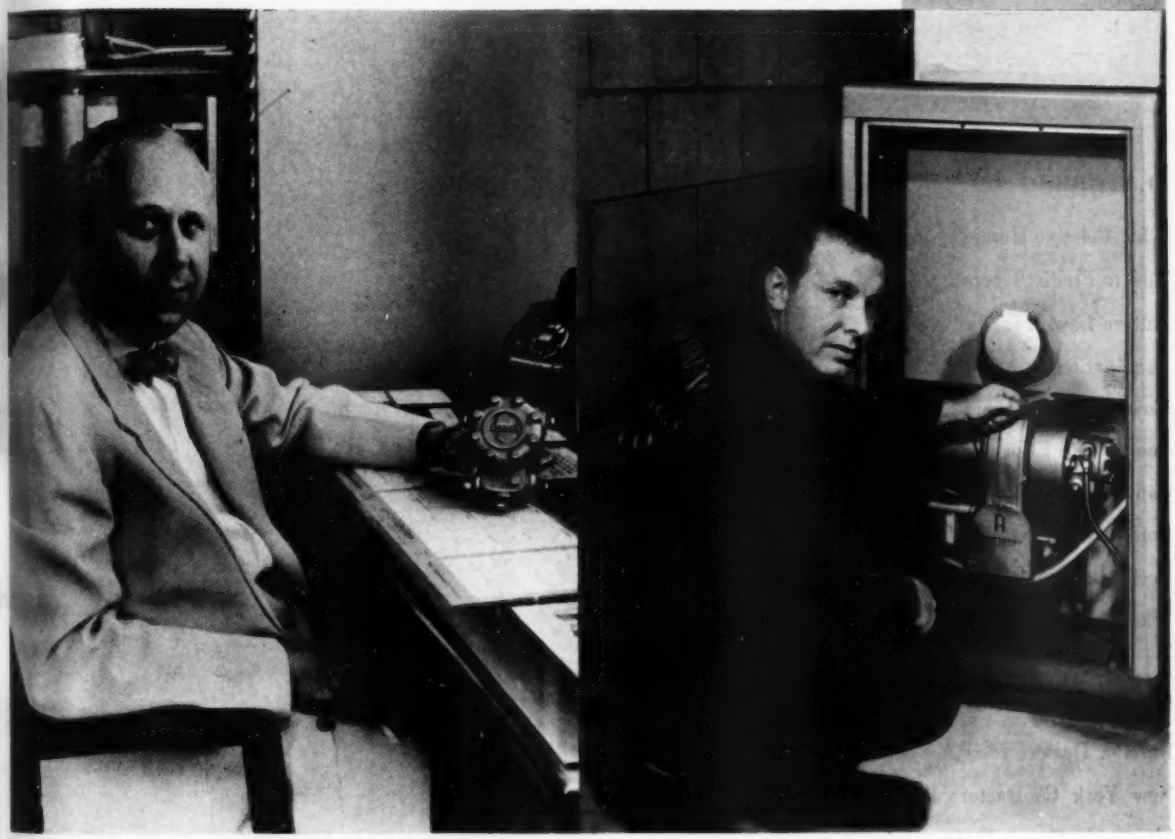
Air Control

PRODUCTS, INC.

DEPT. A COOPERSVILLE, MICHIGAN

Dealer-distributor "team" stresses Sundstrand's freedom from trouble . . .

SUNDSTRAND
1905 1955



Mr. Robert Friestad, General Manager of Grand Furnace Co., Grand Rapids, Michigan. His organization covers 56 counties in the Wolverine State.

Mr. Arnold Van Dyken, Van Dyken Heating Co. of Grand Rapids, inspects Sundstrand Fuel Unit in home of customer.

There's no guesswork when distributors and dealers start talking about mechanical developments—they *know* from personal experience in the field. That's why statements from men like Robert Friestad and Arnold Van Dyken carry a lot of weight.

These men tell us this is the outstanding feature of Sundstrand Fuel Units—"very rugged for long life and durability. Ordinarily they just don't give trouble." These men agree with thousands of others in the oil heating field that Sundstrand units are easier to hook up, require less time to install, are more compact, are competitively priced. They like Sundstrand's complete line, widespread network of service stations, and liberal warranty policy.

Dozens of other reasons could be listed as to why Sundstrand is first with dealers, wholesalers, service stations, and manufacturers. For the complete story, get latest data bulletins.

HIGH-PRESSURE UNITS

Single- and Two-Stage for 3, 6, 10, 14, 20 gph firing rates . . . Strainer capacities—6, 10, 15, 20 gph. (Can be furnished for either fuel oil or gasoline).

LOW-PRESSURE UNITS

Two-stage with fixed or variable metering. For .4 to 1.5 gph firing rates.

Made in Canada by John Inglis, Ltd. 14 Strachan Ave., Toronto

Made in Sweden by Sundstrand Hydraulic Division AB Stockholm

SUNDSTRAND HYDRAULIC DIVISION

. . . a division of Sundstrand Machine Tool Co., 2210 Harrison Ave., Rockford, Illinois

FUEL UNITS • FLUID MOTORS • STACK VALVES • LUBE PUMPS

AMERICAN ARTISAN

MARCH 1955

FEATURES

CONVENTION REPORTS

DEPARTMENTS

Founded 1864

Volume 92 No. 3

WARM AIR HEATING
RESIDENTIAL AIR CONDITIONING
SHEET METAL CONTRACTING

Merged with American Artisan are "Warm Air Heating" and "Furnaces and Sheet Metals"

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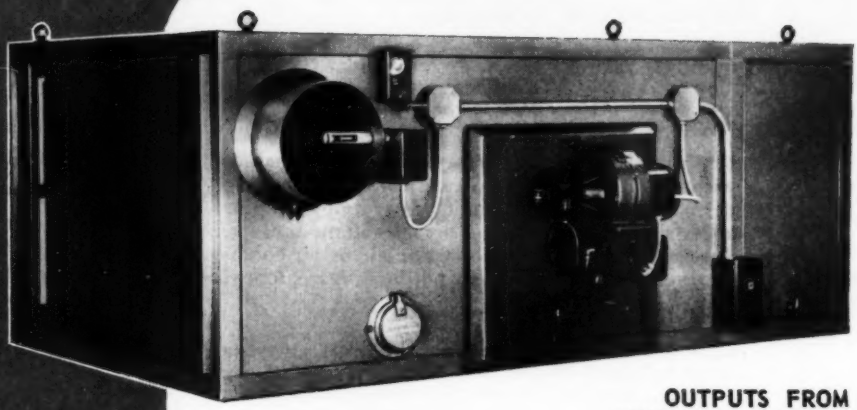
Syncromatic

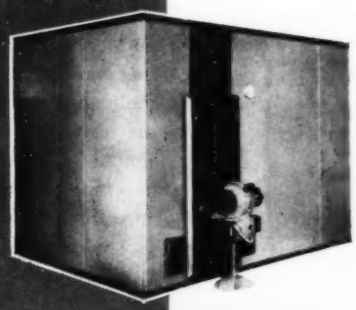
HI-CAP



SUSPENDED
FURNACES
FOR
OIL OR GAS

OUTPUTS FROM
200,000 To 500,000 B.T.U.

The Syncromatic HI–CAP suspended series of steel warm air furnaces incorporates the same high qualities in design and construction as the famous HI–CAP furnace designed for conventional duct systems. For use in commercial and industrial buildings where valuable floor space must be conserved – an important factor in modern construction. Not only is this type heating system a space saver, but real savings in the cost of installation can be realized as well.



HI–CAP Series
330,000 to 1,000,000 B.T.U.

HI–CAP (HIGH CAPACITY) furnaces using the famous patented Counterflow design heat exchanger for maximum efficiency in heat transfer using all fuels. Can be delivered in sections to go thru three foot door. Available to meet all C.F.M. requirements. Special cabinets for use with cooling can be designed on request.

OIL GAS COAL

FOR MORE INFORMATION AND SPECIFICATIONS WRITE–

Syncromatic Corporation

WATERTOWN WISCONSIN

the editor's notebook

Thumbing Through This Month's Artisan

. . . we learn a basis for *Predicting Operating Costs for Residential Air Conditioning* as presented by Robert F. Crossman and I. Burton Faigen. Recognizing the need for such information, the authors combine new information on weather conditions with a streamlining of methods. Based on the relationship between equipment performance and weather conditions in 50 cities, the timely discussion provides sample problems as well as informative reference tables and procedures.

Planning . . .

And we tour an efficiently operated plant where *Imaginative Selling, Engineering Keep Dealer Busy* making installations to fit specific needs. We see a success story built around aggressive merchandising, careful planning and cost control, and adaptation of equipment to the job. Based also on good employee and customer relations, the business has expanded into profitable industrial work as well as retaining its share in the residential market.

Heating . . .

And we join the engineers in solving a heating problem in *Warm Air Floor Panel—Convection Combined To Heat New School* by G. L. Gendler. A warm air floor panel system maintains a mean floor temperature of about 75 F at design conditions supplemented by ventilation from continuous baseboard diffusers. Ideal conditions are maintained by the system to provide a comfortable "learning" atmosphere for students.

the editor's notebook

(continued)

Fabrication . . .

And we see how constant productivity and expansion are achieved when a *Sheet Metal Contractor Builds Prestige on Specialty Lines.* Author Robert Welch describes a business which is well known for fine architectural and industrial work. A large market for specialty items for other industries has established a diversification program which has given birth to subsidiaries for making various types of equipment while the original shop continues a healthy sheet metal contracting business.

Cleaning . . .

And we are shown *How to Clean Stainless Steel* by E. M. Rains, who describes the various methods and their applications. We find the tested procedures to be simple and effective not only in preserving appearance but also in increasing the durability of stainless steel. Soldering flux, welding scale, grease and oil stains, discoloration, rust, etc. fall before cleaning methods ranging from soap and water to electrolytic processes applying to nearly every type of stainless steel installation under many conditions.

the editor's notebook

(continued)

Hugh Reid's Book Gaining Popularity

B. B. LOCKERBY of Faribault, Minn. asks if Hugh B. Reid has published a book containing his sheet metal patterns. We are happy to report that Mr. Reid's book, *Sheet Metal Layout Simplified,* came off the press early this year. Copies are priced at $5.50, and may be purchased from Edwards Bros., Inc., 1745 S. State St., Ann Arbor, Mich.

Mr. Reid says the book is being very well accepted by the trade in the Detroit area and the Ford Motor Training School plans to use it as the official text for all sheet metal apprentices in the company's plants throughout the country. Also, he says, the Detroit Board of Education has approved it for use in the city schools. We are glad to know the book is receiving the recognition it deserves and believe it is making a real contribution to the sheet metal industry as a whole.

Dealer To Pre-Test New Ideas

AT A RECENT breakfast in Philadelphia, Frank J. Nunlist told me that Mueller Climatrol had selected a test dealer in a test city who will cooperate in a field merchandising research project to pre-test new ideas under actual conditions. Extensive efforts were made to select the right city and the right dealer so that the results of the studies can be applied generally. Among the points to be given attention in this program, Mr. Nunlist said, are such subjects as cooperative advertising; hiring salesmen part-time; use of visual aids in training salesmen; making a proper quotation

the editor's notebook

(continued)

(including allowances for advertising, bad debts, etc.); dealer financing of cooling equipment (a carload of cooling equipment may cost considerably more than a carload of heating equipment, he pointed out); and use of open end mortgages, Title I loans, three and five year loans, and conventional bank loans in financing installations.

Bonus to Workers For "No Accident" Year

I THINK the Ansul Chemical Co. chose a fitting way to recognize the achievement by its workers of an accident-free year by presenting each employee with a check for an extra day's pay. The 600 men worked a total of 1,043,199 hours during the calendar year of 1954 without a single accident which caused time to be lost.

Sheet Metal Firm Celebrates 50th Year

WE WERE happy to receive from our good friend, Louis L. Narowetz, a copy of the brochure prepared to commemorate the golden anniversary of the Narowetz Heating and Ventilating Co., one of Chicago's foremost sheet metal firms. We think Mr. Narowetz and his associates have done an excellent public relations job — having brought the Narowetz company to the attention of customers, suppliers and employees alike as an enterprising organization that has truly earned the reputation it enjoys for fine workmanship, integrity of operation and fair dealing at all levels. It was interesting to note, in reading through the pres-

the editor's notebook

(continued)

entation, that the company's founder, Louis S. Narowetz, was an artisan in the old tradition, who served his apprenticeship, won his journeyman's apron, later became heating superintendent for a Chicago contractor and finally went into business for himself as a sheet metal contractor. To the many congratulatory messages which the Narowetz company has received, American Artisan is proud to add one more.

Profit From Other Fellow's Error

I ENJOYED the maxim quoted in a recent issue of the *Heil Merchandiser*: "Learning from mistakes of others is essential. No one could possibly live long enough to make them all himself."

Exposition Forecasts Industry Expansion

IT WAS a pleasure to see the fine array of equipment at the recent International Heating, Ventilating and Air Conditioning Exposition in Philadelphia sponsored by the American Society of Heating and Air-Conditioning Engineers. The large number of exhibits — which reached a total of 472 — indicated the confidence with which manufacturers of heating and air conditioning equipment view the future of our industry.

It was interesting to note that almost invariably residential heating units were shown with adjunctive cooling units. Another indication of the growing acceptance of residential air conditioning was afforded by the number of cooling systems on display that were designed for application in homes already heated. One thing I noticed in particular was the attention being given to product appearance. Almost all the window coolers I saw, for example, had been restyled and it was evident that the colors had been carefully selected to blend with various types of room furnishings. Other equipment was designed to be as inconspicuous as possible, and this trend toward concealment was evidenced by many of the registers, diffusers and grilles exhibited, as well as cooling units designed to be set flush with window draperies or set in the wall.

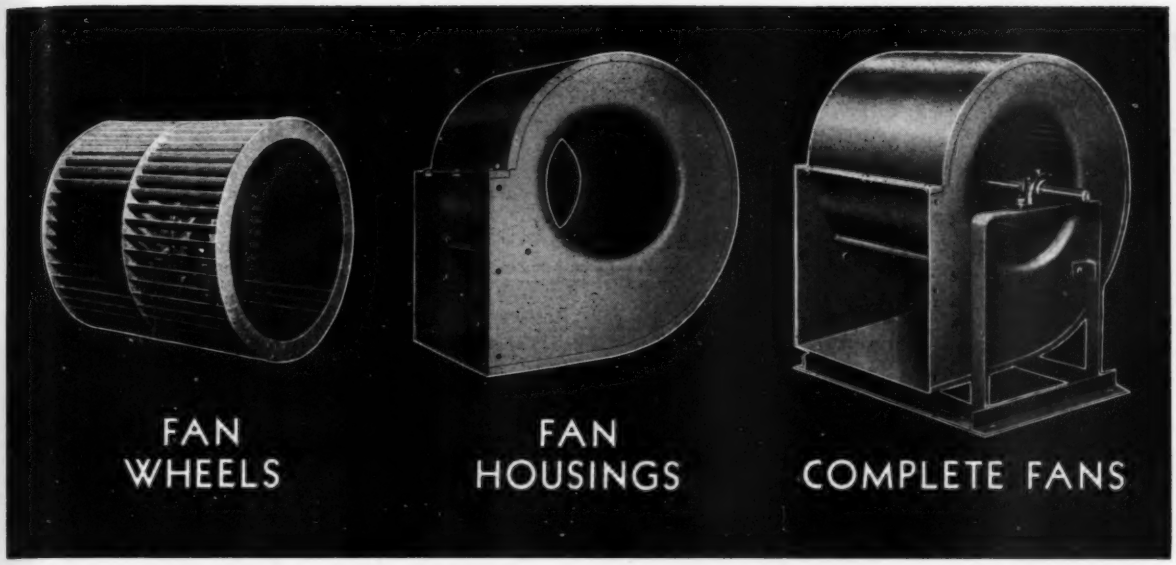
Many of the displays featured component parts of complete systems, ranging from valves, switches, belts and bearings to such assembled units as motors, oil burners, gas regulators, fans and blowers, ducts, fittings and stacks. There were instruments, such as thermometers, thermostats, humidistats, gages and analyzers and — of particular interest to the contractor and heating service man — a number of time-saving tools and equipment for use in the field.

Attendance reached a total even higher than anticipated, with figures showing a substantial number of "repeat" visitors. (By week's end the registration was 21,162, while the number of visitors checked at the door numbered 34,758.)

How to Obtain NWAHACA Manuals

MARVIN G. MATHIS, JR. writes to ask how he can obtain "the NWAHACA manuals so often mentioned in Artisan's articles on heating and air conditioning."

We refer Mr. Mathis and any other interested readers



Clarage "air power" gives your equipment

GREATER SALES POWER

Increased saleability — you get it when you install Clarage equipment in your air conditioning units, evaporative condensers, cooling towers, circulators, etc. The experience of leading manufacturers backs that up!

All down the line — from the unit manufacturer, to the installer, to the user — you'll find Clarage equipment PREFERRED because of its ability to provide full rated performance and trouble-free operation under the most exacting requirements. Construction throughout is heavier than that of ordinary furnace blowers.

Wheels, housings, or complete fans are available in 11 standard sizes with capacities from 200 to 10,000 cfm. Special features and constructions can be furnished for unusually high pressures or extremely severe service conditions.

To obtain full information, including dimensions and capacity ratings, request Catalog 603-A . . . or call in our nearest sales engineer. **CLARAGE FAN COMPANY, Kalamazoo, Michigan.**

You can Rely on **CLARAGE** . . . *dependable equipment for making air your servant*

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

the editor's notebook

(continued)

to the National Warm Air Heating and Air Conditioning Association, 145 Public Sq., Cleveland 14, which has published a number of authoritative manuals and work sheets of interest to the warm air heating and air conditioning dealer.

Wants Service Man To Receive Artisan

GEORGE H. STURDEVANT requests that American Artisan be sent to his service man because "I feel it will make him more efficient in his work to read it." We agree with Mr. Sturdevant that much of the information contained in American Artisan is just as interesting to service personnel as it is to management, and we are glad to note the growing trend among contractors and dealers to make copies available to employees. The service man, as well as his boss, is interested in Artisan's reports on new and improved servicing and installation techniques constantly being developed in the field.

Sees Living Standard Doubled by 1975

RICHARD L. BOWDITCH, board chairman of the U. S. National Chamber of Commerce, predicts that the U. S. standard of living in 1975 will be double that of today. Biggest share of the change, he says, probably will result from an increase in productivity through the use of automatic machines. Discussing life in 1975, Mr. Bowditch offered these predictions:

Higher incomes will enable nearly every family to own an auto. About 15 percent will own two cars.

Increased productivity will enable the work week to be

the editor's notebook

(continued)

reduced to 35 hours and permit longer paid vacations.

U. S. population will be 200 million, an increase of 40 million.

"These and other changes," he says, "won't be the result of destiny. They will be the result of man's drive and ingenuity. We can't live in the past and expect to find the future much better. . . . political and social disturbances can toss these optimistic prospects in the ashcan, but if we are left alone to do the job that must be done, then we'll do it."

1955 Marks Firm's 100th Birthday

AT A RECENT press conference held by the Crane Co., which is celebrating its 100th anniversary this year, I learned something of the history and achievements of the 100-year-old firm. Richard Teller Crane was 23 when he opened his shop on July 4, 1855 in Chicago, then a bustling city of some 75,000. The R. T. Crane Brass and Bell Foundry, as the company was then called, produced brass couplings and copper tips for lightning rods, articles much in demand in those days. From this beginning, the company has expanded and branched out until now it manufactures thousands of products and operates 150 branch houses in the nation. Most recent addition to the organization is the new plant in Chattanooga, where titanium — a lightweight, corrosion resistant metal — will be produced. Dedication of the new plant will be a feature of the company's centennial observance.

Clyde M. Barnes

EDITOR

New stars in the Janitrol

BRING YOU MORE SALES

DOWN-FLOW FURNACE

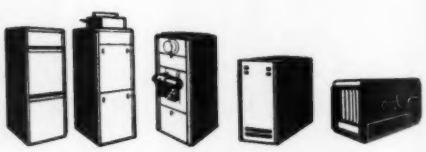
An all-new, gas-fired warm air conditioner designed for the popular perimeter-type heating used in basementless homes. The unit has the exclusive Multi-thermex heat exchangers and quiet ribbon-flame burners. Standard blower has capacity for small duct systems; optional blower available for use with cooling. All parts and controls are easily accessible from the front. Approved for close clearance and closet installations. Available in 80,000, 100,000 and 120,000 Btu/hr. inputs.

HORIZONTAL COOLING UNIT

This new summer conditioner gives you new flexibility for your central cooling installations. Can be located in attic, crawl space or suspended overhead. Uses include combinations with existing forced warm air systems; as unit coolers (with blowers); or with wet heat systems, since minimum duct work is required. The water-cooled refrigerating unit is hermetically sealed and warranted. Separate blower-filter units are available. Capacities are 2 and 3-ton, 230 V., single phase.

®Janitrol
HEATING AND AIR-CONDITIONING
DIVISION

Surface Combustion Corporation, Columbus 16, Ohio
In Canada: Alvar Simpson Ltd., Toronto 13



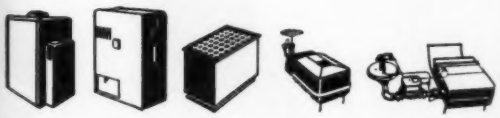
PARADE OF PROGRESS

AND PROFIT OPPORTUNITIES

all New

UNIT HEATERS

The famous Janitrol Gas-Fired Unit Heaters have been redesigned for even better performance and easier installation! They're acoustically engineered for a new standard of quietness. The new compact design gives more "head-room" clearance. Every size has the famous Multi-thermex heating heart and double-safety overheat control for extra durability and performance. All of the many improvements will make these new Janitrols easier for you to sell, install and service.

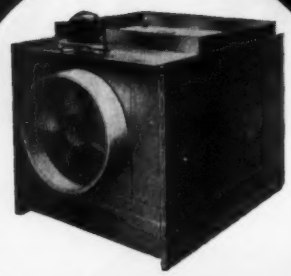


PRE-SOLD FOR YOU BY *National Advertising*

Janitrol products are consistently advertised in these top national magazines. All of your prospects . . . home owners, builders, architects and commercial-industrial users . . . are pre-sold, to make your selling easier.

WHOLESALERS AND CONTRACTORS

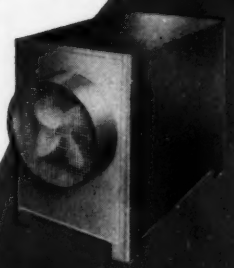
Write for all the facts on the Janitrol line of quality heating and air conditioning equipment.



MARLEY AQUATOWERS
(large capacity)

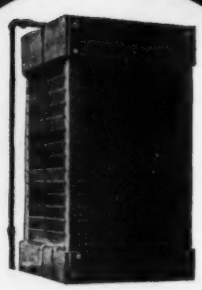
MARLEY AQUATOWERS
(medium capacity)

to get a line on
Modern Water Cooling
Dial M
FOR
MARLEY

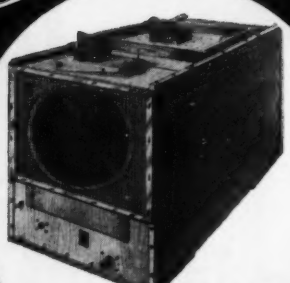


MARLEY AQUATOWERS
(small capacity)

MARLEY A[illegible]COOLER



MARLEY SPRATOWER
(Natural Draft)



MARLEY REDWOOD
AQUATOWER

Call your local Marley application engineer for complete information on these towers.

"Dial M" for Marley—and you've got a direct connection to the world's most complete, most original line of water cooling towers for air conditioning and refrigeration. You have a direct wire, too, to the world's most *profitable* line of cooling towers—for Marley's the line that eliminates service headaches, call-backs, and kick-backs.

So just dial Marley—and state your problem. Need a tower for indoor installation . . . or outdoor? Must it comply with fire codes? Any special corrosion problem? No matter! In the Marley line there is a tower to meet every service condition and every capacity requirement.

Best of all, Marley towers are available when and where you need them. Stocks are maintained in all important cities. Just dial Marley—and a trained Marley engineering representative will assist you without obligation in solving any cooling tower problem that arises.

MARLEY AQUATOWERS

... standard of the air conditioning and refrigeration industries—the most imitated products in the field. But the 1955 Aquatowers contain numerous features that can't be copied—new design compatibility, new harmony with surroundings, a new standard of performance. New Aquatower styling features the same eye-appealing appearance found in other consumer appliances. In some models all projecting parts are covered; covers and intake screens are available. Higher performance and simplified service are engineered into all models. For larger installations, Marley Aquatowers feature all-bolted construction to facilitate hoisting, handling and assembly. Aquatowers are built in 11 sizes to serve air conditioning equipment in a wide range of capacities.

MARLEY AQUACOOLER

... and the newest tower to complete the Marley line is the Aquacooler*, an induced draft, counter-flow tower. New Aquacoolers can be installed indoors or out. Venting discharged air is very simple and external static pressure is overcome by the centrifugal fan. They are available in 5 sizes for service ranging from 3 to 15 tons.

Marley engineers have spared no details to make the Aquacooler the best tower equipped with centrifugal blower type fan. Typical of the quality built into this new tower are these features: A balanced spray system equipped with patented Marley cast bronze two-piece nozzles . . . nailless MarPak* type filling, fabricated from select heart quality redwood . . . centrifugal type blower fan, hot-dipped-galvanized after fabrication . . . all interior surfaces coated with corrosion resistant Marmastic undercoating.

*AQUACOOLER is the exclusive trade mark of the Marley Company

MARLEY REDWOOD AQUATOWER

... cooling tower to utilize the forced-draft, cross-flow vertical discharge principle. The new tower is designed especially for localities where corrosion is a problem. Because of the forced-draft design, mechanical equipment is removed from the hot, humid air stream. The all-redwood construction is highly resistant to corrosion and its appearance is enhanced by attractive redwood resin stain.

MARLEY SPRATOWERS

... bottom cost: there is nothing like a Marley SpraTower. Every structural member of these rugged towers is of heart quality redwood. Spray nozzles are Marley's own patented non-clog design. For smaller units the basin is pre-assembled to facilitate erection.

Series 200 SpraTowers are built in expandable standardized units for any capacity service, and are also available with atmospheric sections. They feature the same rugged simplicity and economical operation as Marley's smaller towers.

*Trademark registered

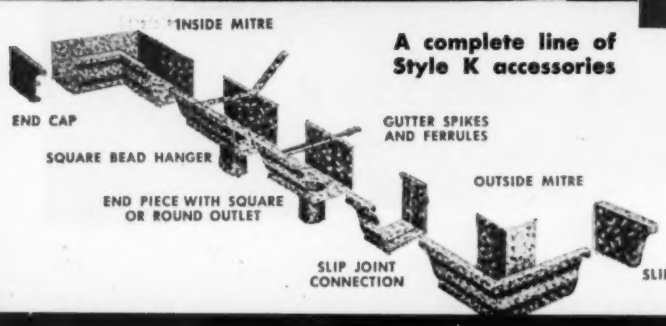
MARLEY

The Marley Company

Kansas City, Missouri

"I like Milcor Style K Gutter, because it has a tight, uniform coat of galvanizing, with no fractures in the spelter,"—says *Ed Hickey, Master Heating and Sheet Metal 1314 Ogden Ave., St. Louis, Mo.*

"Milcor Style K Gutter jobs go up fast, because Style K accessories are all uniform in shape and fit together easily," — says *Cecil R. Cook, Mgr., H. B. Clifford Roofing Co. 2730 Lawton Ave., Detroit 16, Michigan*



A complete line of Style K accessories

In Michigan or Missouri or anywhere else...

MILCOR®

Style K Box Gutters are first choice for a profitable job and a better one

THE really successful sheet-metal men — the ones who are making good money — the ones who go all out to satisfy their customers — they're the men who know it takes *galvanized steel* to do a real gutter job. And they're the ones who use Milcor Style K Box Gutters every time.

The rigidity of Style K makes it easy to handle. Because of it, Style K holds up under the ladders various trades lean against it. Moreover, every length of Style K—every accessory — is precision manufactured, perfectly formed, and easy to fit. So Style K jobs are faster to hang—and once they're up, they remain a credit to your reputation.

Stock up on Style K and other Milcor Gutter and Conductor Pipe items — it pays. Prices and further information are available from your jobber or the nearest Inland Steel Products Company branch listed below.

8-131

INLAND STEEL PRODUCTS COMPANY

4023 WEST BURNHAM ST. • MILWAUKEE 1, WISCONSIN

BALTIMORE 5, MD., 5300 Pulaski Highway — BUFFALO 11, N. Y., 64 Rapin St. — CHICAGO 9, ILL., 4301 S. Western Blvd.—CINCINNATI 25, OHIO, 3240 Spring Grove Ave. —CLEVELAND 14, OHIO, 1541 E. 38th St.—DETROIT 2, MICH., 690 Amsterdam Ave. —KANSAS CITY 41, MO., P. O. Box 918—LOS ANGELES 58, CALIF., 4807 E. 49th St. — NEW YORK 17, N. Y., 230 Park Ave. — ST. LOUIS 10, MO., 4215 Clayton Ave.

SMCNA Prepares Program For 4-Day Convention

APRIL 27, 28, 29 AND 30 are the dates chosen by the Sheet Metal Contractors' National Association for its annual convention, which will be held at the Mark Hopkins hotel, San Francisco. J. D. Wilder, executive secretary of SMCNA, reports that this year's program plans call for the streamlining of the business of the association to allow more time for member participation in the discussions of the forums, conferences and special activity panels. Also, because San Francisco has so much of interest to offer the visitor, more "free" time than usual has been made available. Thus, members will have an opportunity to try some of the city's famous eating spots, see the giant redwood trees in Muir Woods and visit Fisherman's Wharf, Chinatown and other points of interest within the city. Wives planning to attend will be pleased to know that a special tour of several of San Francisco's finest shops is being arranged for them. Secretary Wilder points out that the dates chosen fall in the latter part of the week because it is anticipated that the ladies' registration will run unusually high, and members can save substantial travel expense by taking advantage of family plans in effect during the last days of the week.

Tentative program plans provide for a warm air heating and cooling conference, a meeting of the labor relations committee area advisors and a meeting of the national specialty contractors and sheet metal fabricators. Members attending the labor relations forum will hear reports on the National Joint Adjustment Board and the National Joint Board for the Settlement of Jurisdictional Disputes. The association's attorney will report on legal problems and the fringe benefits committee will discuss

(*Continued on page* 22)

Michigan, Penn State Schedule Short Courses

THE NATIONAL Warm Air Heating and Air Conditioning Association reports short courses are scheduled at Michigan State University March 28 to 31 and at Pennsylvania State University April 6 to 8. Subjects to be covered include:

- Location of perimeter diffusers
- Chimneys and drafts
- Duct sizing
- Research
- Selling forced warm air heating
- Trends in year 'round air conditioning

For details relating to campus accommodations at Michigan State, write R. J. Waalkes, Department of Mechanical Engineering, Michigan State College, East Lansing, Mich. In charge of accommodations at Penn State is T. A. Wright, Room 103 Mechanical Engineering Bldg., State College, Pa.

John Haines Elected ASHAE President

JOHN E. HAINES was elected president of the American Society of Heating and Air-Conditioning Engineers at its recent annual convention. Mr. Haines, vice president of Minneapolis-Honeywell Regulator Co. and head of the company's commercial controls division, has been a member of the society since 1940. He served as first vice president during the past year and as second vice president in 1953. Other officers elected are John W. James, first vice president; Peter B. Gordon, second vice president; and Elmer R. Queer treasurer.

Management Courses For Businessmen

SMALL BUSINESS Administrator Wendell B. Barnes reports that SBA is cosponsoring 51 short courses in administrative management for owners and managers of small businesses for the school year 1954-55. Mr. Barnes points out that the necessity for the small business owner to concentrate on day-to-day operations prevents him from devoting much time to improving his overall knowledge of business administration, or to learning more about planning, organization control and other phases of management. He explained that in some cases the individual courses are referred to as clinics, conferences or seminars, but that they all have the same purpose — "to provide owners and managers of small firms with current, helpful information on *administrative* management, in contrast to *operative* management."

Courses will be held in the following states: Arizona, Arkansas, California, Florida, Kansas, Maryland, Massachusetts, Missouri, New Jersey, New Mexico, New York, North Carolina, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Virginia, West Virginia, Wisconsin and the District of Columbia.

For further details, write The Editor, American Artisan.

Grant Made to Study Friction of Metals

THE ARMY ORDNANCE Corps has granted $19,341 to the Mechanical Engineering Department at Carnegie Institute of Technology to continue a three-year study on friction of metals. The project is presently concentrating on titanium which, though it has a lightness approaching aluminum and a strength comparable to steel, also has the undesirable quality of tearing easily with friction.

A NEW Built-In Damper on Every PERIMETER DIFFUSER

. . . AT NO INCREASE IN PRICE

. . . There is *no extra cost* for (1) NEW BUILT-IN DAMPER, (2) SPARKLING NEW BEIGE METALLIC HAMMERTONE FINISH, (3) NEW DAMAGE-PROOF SAFETY PACKAGING . . . with each diffuser individually packed.

Here is the most advanced new perimeter diffuser model. Built to such precision standards, it is *years ahead in design, appearance, performance.* It is truly the most efficient diffuser ever built . . . handling cool or warm air with equal efficiency . . . keeping uniform temperatures throughout the room . . . directing the air where it is most needed . . . eliminating low level stratification.

SEND FOR FREE CATALOG TODAY!

TITUS Inc., WATERLOO, IOWA

Gentlemen: Please send me free brochure on new TITUS PERIMETER DIFFUSER . . . that is creating a new trend in air diffusion.

Name

Address

Company

City State

(*Continued from page* 19)

Work on SMCNA Convention Plans

(*Continued from page* 19)

welfare, vacation and pension plans. Curtain wall jurisdiction will be discussed and there will also be a report on residential and industrial wage rates and unions. The business management forum will feature a panel composed of authorities on various phases of management who will answer members' questions on the new tax code, cost and estimating, insurance, etc. Election of officers will be held Thursday morning, following which the results of the 1955 apprenticeship contest will be announced and awards presented to the winners.

Entertainment planned includes a harbor cruise — rated one of the nation's most unusual water sightseeing experiences — and a reception in the hotel's famous "Top-of-the-Mark," from which members may enjoy a sweeping view of the city. For the ladies there will be a special showing of "Cinerama," luncheon with the men at Fisherman's Wharf, the harbor cruise and an all-day sightseeing tour.

Small Business Gets More Defense Contracts

MORE THAN $400 million in military purchases have been set aside for award to small firms under the Small Business Administration-Department of Defense program to increase the small business share of defense orders, according to SBA Administrator Wendell B. Barnes. In announcing the total of contracts which have been set aside for small business, Mr. Barnes said: "Although the actual awarding of contracts under the program necessarily lags behind the decision to restrict certain purchases to small business, small firms already have received more than 2600 contracts totaling about $180 million."

Construction Sets New Record in '54, Tops 1953 Peak in Each of 12 Months

A NEW RECORD of $37.2 billion was established for all construction activity in 1954, with outlays exceeding the 1953 peak every month, according to preliminary estimates prepared jointly by the U. S. Departments of Commerce and Labor. The total value of new work put in place was 5 percent above the 1953 figure, and made 1954 the eighth consecutive year in which construction activity reached a new high. The major part of the increase from 1953 in total dollar outlays occurred during the second half of the year. Largely responsible for this, according to the report, was the unusually high volume of private dwellings started last fall, which reflected increased supplies of funds for mortgage investment, as well as the liberalized mortgage loan provisions of the Housing Act of 1954.

The F. W. Dodge Corp., reporting building awards for the 37 states east of the Rockies, gave the following totals for 1954: residential, $8,518,291,000, up 31 percent over 1953; non-residential, $7,110,348,000, up 2 percent; public works and utilities, $4,141,568,000, up 3 percent. The grand total for the 37 states was up 13 percent.

Guaranteed Wage Big Issue in '55

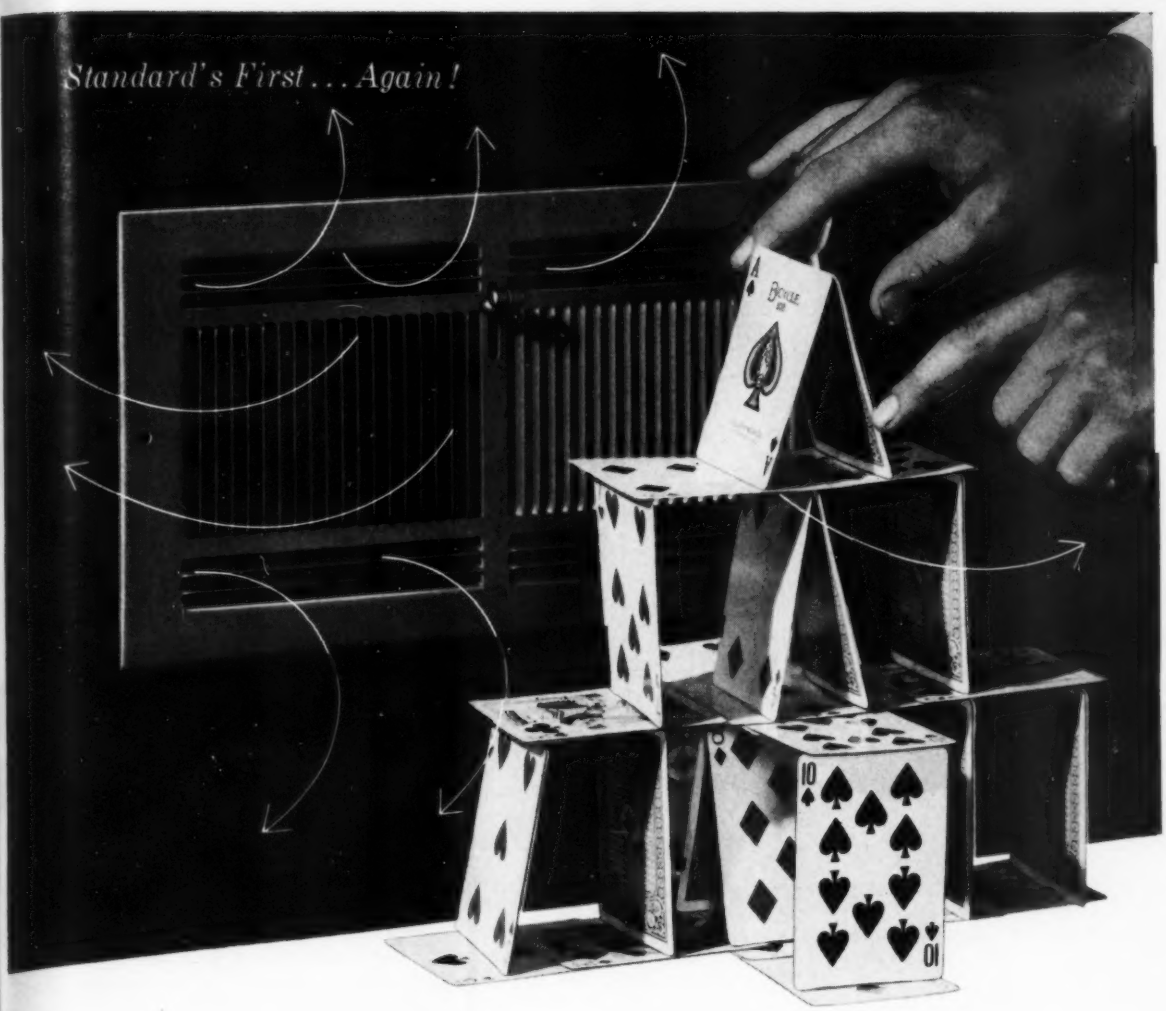
"THE GUARANTEED annual wage will be the big issue in collective bargaining this year," Labor Secretary Mitchell said recently. "This is already the major CIO demand in the auto industry and it is bound to come up elsewhere. I think the American worker mainly is looking for stable employment."

Editorializing on the subject, the *Washington Report,* published by the Chamber of Commerce of the United States, points out that "it is the ability of a company to adjust to changing market conditions that provides employment stability. Fixed wage commitments limit flexibility. Thus, a company with a 'guaranteed' wage may offer less security to its workers than one without it." It quotes a statement by the George A. Hormel Co. of Austin, Minn. as follows:

"Our company is, of course, unable to redeem the money consideration in such a guarantee unless we can keep our people actually and profitably employed. The entire asset value of our company, cashing everything we own, would only be sufficient to redeem a 10 months' guarantee. The only guarantee we know of is the ability of management to manage, coupled with willingness of workers to work. If either fails, then the guarantee fails."

Heating Firms Complete Merger

THE NATIONAL Radiator Co. has merged with the United States Radiator Corp. to form the National-U.S. Radiator Corp. "It is expected that substantial manufacturing economies and intensified research, as well as broadening of markets will result from the merger," according to Theodore B. Focke, president of National Radiator, and William C. McCord, president of U. S. Radiator. "The two companies supplement each other and the combination is logical from the financial as well as operating standpoint." The two officials stated also that "it is expected the air conditioning division of the consolidated corporation will be greatly expanded."



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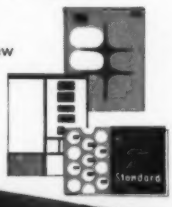
if you use **Standard's No. 551** *. . . no blasts, no hot spots, no cold corners!*

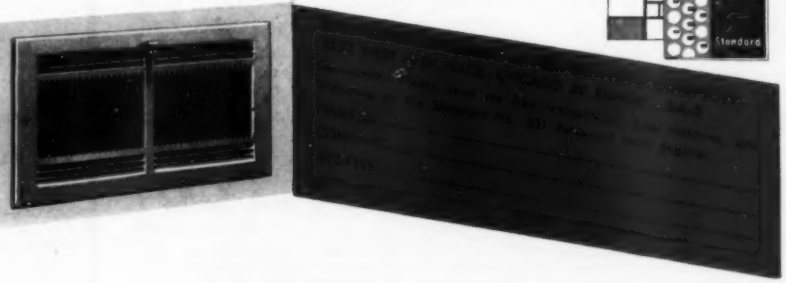
Standard's Perimeter Wall Register (No. 551) ends hot air blast and spotty heating for all time. Its 4-way, 360° diffusion of air provides complete hemispheric heating and cooling comfort. Warm air is distributed evenly along the outer cold walls, resulting in uniform temperature control throughout each room.

- NEW FRACTIONATOR VOLUME CONTROL
- STANDARD SCREW HOLES
- SINGLE SHUTTER CONTROL
- SMART APPEARANCE
- FOR SIDEWALL OR BASEBOARD INSTALLATION
- ACCLAIMED BY THOUSANDS OF HOME AND COMMERCIAL BUILDING OWNERS

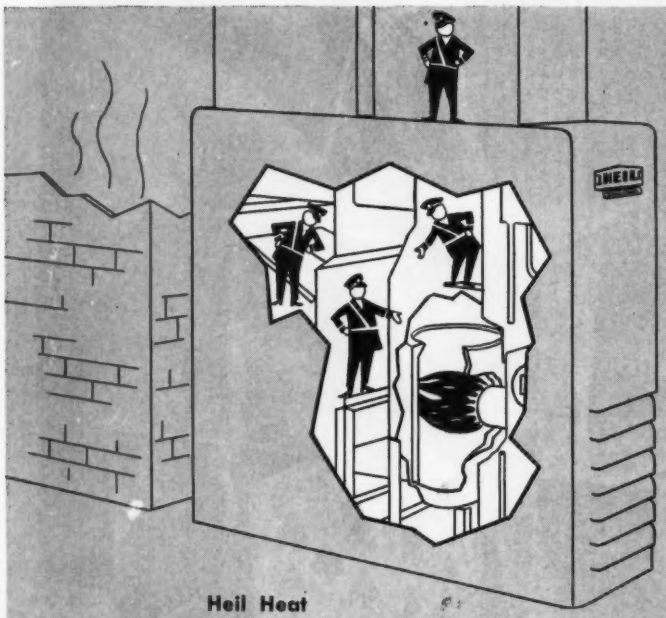
WRITE NOW! See for yourself why the Standard 551 is the best perimeter wall register on the market! Mail the coupon for copies of testimonials and case histories of people who are enjoying real indoor comfort with Standard's new 551 Registers. We'll rush them to you free, along with descriptive literature.



STANDARD STAMPING & PERFORATING CO.

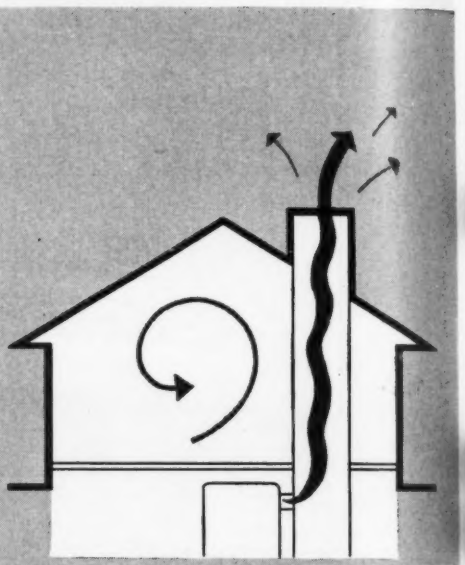


What the Heck Is a Heil Heat Bank?



Heil Heat

Heil's multiple baffled flue passages travel heat *further* . . . deliver more working heat *into the home.*



Ordinary Heat

Ordinary designs waste heat up the chimney, increase fuel costs.

. . . and why is it money in the bank for you?

A Heil "Heat Bank", very simply, is the exclusive tapered-top heat exchanger that pays the user dividends in extra *working* heat . . . pays *you* dividends in extra sales!

In addition, Heil offers you a complete line to fill *any* central heating or cooling need . . . *proved* more efficient operation . . . meticulous factory inspection, *assembly and wiring* . . . low guarantee-service history . . . and a famous name and reputation. *All* good reasons why you'll profit more with Heil!

HEIL helps the wholesaler because the wholesaler helps you save money . . . in stock, inventory, buying and business expenses. Support your wholesaler, work with him . . . and profit!

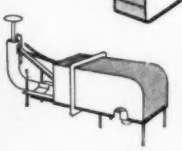
The HEIL Co. is a member of OHI, GAMA and an associate member of NHWA.

13 Oil Furnace-Burner Units
Bonnet Capacities from
80,000 to 224,000 BTU

14 Gas Furnace-Burner Units
A.G.A. Input Ratings from
60,000 to 200,000 BTU

5 Conversion Oil Burners
Maximum Unit Output Ratings from
147,000 to 592,000 BTU

12 Summer Air Conditioners
Rated from
24,000 to 36,000



3 Conversion Gas Burners
A.G.A. Input Ratings from
70,000 to 400,000 BTU

THE HEIL CO.

Milwaukee, Wisconsin — Hillside, New Jersey

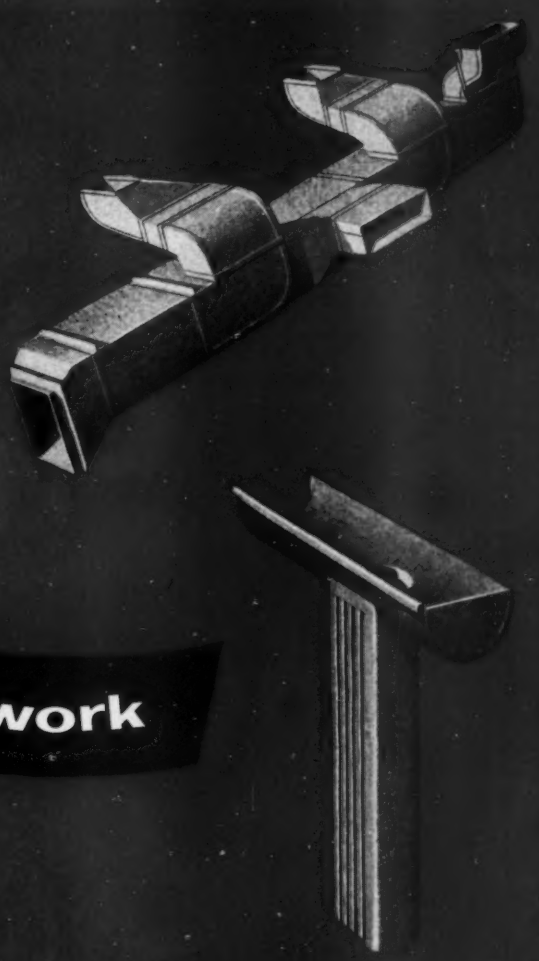
SALES OFFICES: New York, N.Y.; Union, N.J.; Atlanta, Ga.; Cleveland, Ohio; Chicago, Ill.; Milwaukee, Wis.; Kansas City, Mo.; Denver, Colo.; Dallas, Texas; Los Angeles, Calif.; Seattle, Wash.

Write us direct for more information about the complete Heil line and for important news concerning territories available.

There's built-in durability in

WEIRKOTE

...or all sheet-metal work



Wherever a durable zinc-coated material is needed for sheet metal fabrication, there's nothing better than Weirkote. Gutters, downspouts, ducts—no matter what the application, the name Weirkote on galvanized steel means uniformly high quality steel, tightly coated with zinc to resist cracking, peeling, flaking and corrosion. The high quality is assured by Weirton's modern mills and methods —and men.

When your specifications call for galvanized steel, call Weirton, and be sure.

Weirkote is available in coils and cut lengths: gauges 16 to 30 inclusive. Maximum width—42", maximum cut length—168". Weirkote can be obtained to fit any customer requirement. For standard roofing and siding it is guaranteed to conform to A.S.T.M. specification A361-52T.

PITTSBURGH LOCK

WEIRTON STEEL COMPANY

Weirton, West Virginia

NATIONAL STEEL CORPORATION

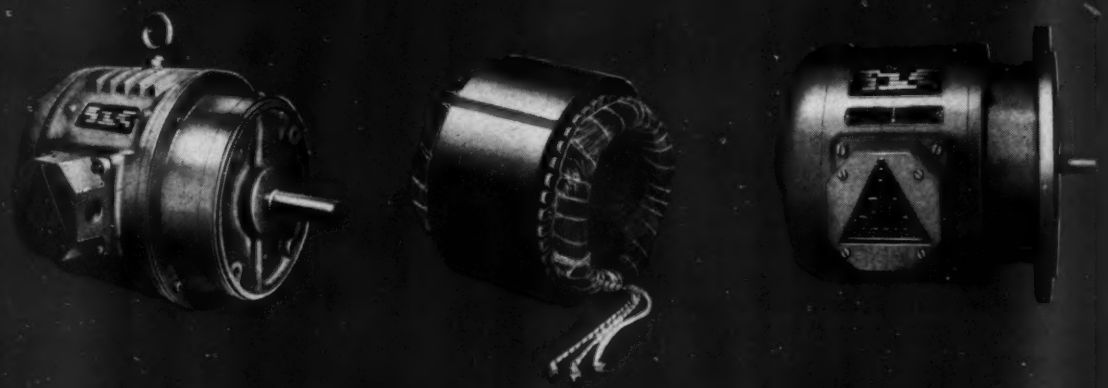
WEIRTON STEEL COMPANY

DELCO
DAYTON OHIO

For On-Time Delivery

Volume depend

A complete line of



"The lady who is wise will ask to be advised if it's powered with a Delco Electric Motor."

Dependability of *delivery* means a lot to a volume producer, and many a customer has learned that he can expect it—and get it—from Delco Products. He knows that whatever the size of his order, Delco will deliver, *when* he wants it, *where* he wants it.

And there's another kind of Delco dependability, too—the dependability that Delco

★ ***Watch for Delco Electric Motor national advertising now appearing in The Saturday Evening Post.***

BARBER COLMAN

UNI-FLO ENGINEERED

Air Distribution

Puts shoppers in buying mood at Burdine's . . .

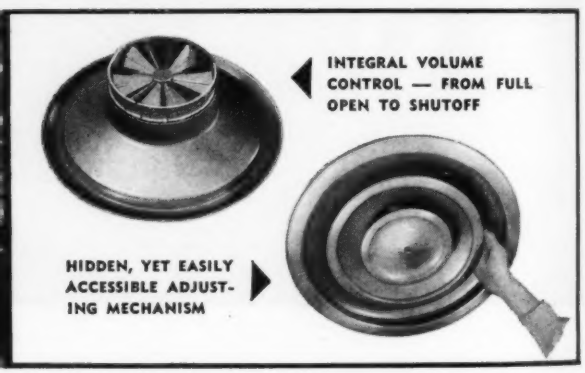
It isn't often that a mechanical engineer says "The equipment has usually exceeded the performance of published data." Yet that's the comment made after Uni-Flo equipment was installed throughout the beautiful new home of famed Burdine's in Miami Beach, Florida. Not only was performance above par, but, as can be seen below, the Venturi-Flo Diffusers are small and inconspicuous in appearance, harmonize with the decorated ceilings, are easy to adjust. Experience indicates, too, that Venturi-Flo Diffusers keep ceiling smudge at a minimum.

Architects: WEED, RUSSELL, JOHNSON, AND ASSOCIATES. *Interior Designer:* RAYMOND LOEWY. *Structural Engineers:* NORMAN J DIGNUM AND ASSOCIATES. *Mechanical Engineer:* R. L. DUFFER. *Air Conditioning Contractor:* HILL-YORK SALES CORP.

New, two-story building (83,400 square feet) covers approximately a city block, provides an ultra-modern, luxurious setting for Burdine's "Sunshine Fashions."

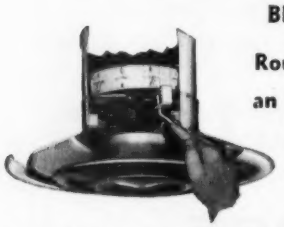
Entire store is air conditioned for shopping comfort. Venturi-Flo Diffusers distribute the conditioned air quietly, unobtrusively, efficiently.

Using from 15% to 100% outside air, the atmosphere throughout the building is kept fresh and inviting for personnel and shoppers, regardless of store traffic and weather conditions.



Venturi-Flo Ceiling Diffusers provide efficient diffusion, rigid construction, quiet operation, easily adjustable deflection and volume control, advanced styling.

BLAZING THE TRAIL TO BETTER AIR DISTRIBUTION



Round Ceiling Diffusers . . . an early pioneering success

Barber-Colman Company's entrance into the air distribution field twenty years ago started an increasing flow of pioneering developments. From the largest and best equipped laboratory in the industry came the Venturi-Flo Ceiling Diffusers, first of a series of ceiling diffusers designed for balanced air distribution in modern buildings. In these units, air patterns are adjustable after installation from vertical to horizontal discharge. A wide range of styles and sizes is available for recessed or surface mounting, with or without integral lights. Accessories include volume control, air flow balancing and air turning devices. For latest literature and expert engineering advice, consult your nearby Field Office or write us.

Barber-Colman Company

Dept. O, 1106 Rock St., Rockford, Illinois, U. S. A.

Washington Letter

School Construction Plans To Increase Industry's Activity?

By Arnold Kruckman

• A big share of a seven billion dollar program may be in the offing for dealers and contractors

• It's a nationwide market potential which calls for planning and preparation

THE PRESIDENT'S PROPOSED $7 billion program to build new schools in all parts of the country is of particular interest to heating dealers, sheet metal contractors and those associated with them.

As is well known, the President proposes a three point federal aid program for school construction. First, the federal government would purchase school bonds issued by local communities which they are unable to sell elsewhere at a reasonable interest rate. Second, federal money would be supplied to match state funds in setting up initial reserves to cover payments on bonds issued by statewide school building agencies. The schools would be leased to communities which cannot finance their own buildings because of debt limits. Third, outright federal grants would match state funds to help build schools in communities too poor to build or lease new schools on their own responsibility.

In addition, the President urges authorization of federal funds for a three-year period.

During the first year money is to be appropriated to finance half the administrative costs of state programs designed to overcome obstacles to local school financing or to provide additional state aid to local school districts.

This school aid program has been long discussed as a prospect by contractors and government people in Washington. The President proposed it in a special message to Congress early in February after a long conference in the White House with Republican Senate and House leaders. Generally, it is understood leaders of both parties are very favorable to enactment of the program. It is intended to supply as swiftly as possible more than 300,000 classrooms over the country.

According to the American Iron and Steel Institute, the need for the additional classrooms for this school year is causing increased interest in one story school buildings of all-steel construction. Such buildings, the institute says, with steel panel walls, roof decks, room partitions and accessories, are being recommended by engineering organizations because they can be constructed quickly and economically, are non-combustible and reduce the hazard of small fires becoming big ones.

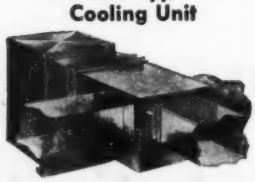
The bulk of the three-year $7 billion school building program would come through federal agencies in cooperation with statewide school building agencies. It is not yet clear with whom the general contractor will do business. State agencies would issue bonds and build schools for lease to local school districts as outlined. The schools would be leased by the state under a system providing rentals sufficient to cover payments on principle and interest of bonds, payments to a reserve fund, and a proportionate share of the administrative expenses of the state school building agency. In all likelihood general contractors would do business with both the state and the federal government, often with some participation by the localities in which the schools are built.

The part played in this program by the warm air heating dealer will of course depend largely on his merchandising efforts in this direction. It's a big market and obviously a competitive one.

(*More Washington news on page* 32)

. . . the industry's most complete yearound air conditioning line

Duct Type Cooling Unit

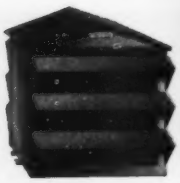


Assure yourself profits 365 days a year. Offer your customers a choice of more than 140 heating and cooling units . . . all featuring the most modern developments and design . . . to fit any type or size house.

Get your furnaces, fittings and cooling units *all from one source* under one brand name . . . WILLIAMSON. Let us show you in detail how comparison proves WILLIAMSON selling superiority all year 'round.

WILLIAMS

HEATING



Compressor Unit

Counter-Flow Heating and Cooling Unit

Space Cooling Unit

COMPLETE HEATING LINE . . .

- GASAVER and OILSAVER Deluxe Furnaces . . . 1st really new feature in warm air heating in last quarter century. Lo-Boy, Hi-Boy, Gravity
- FLO-WARM Gas, Oil and Coal Furnaces . . . highest quality at price unmatched for value per dollar. Lo-Boy, Hi-Boy, Counter-Flow, Horizontal
- ASSEMBLED Gas and Oil Furnaces . . . WILLIAMSON quality at competitive prices—factory assembled, wired and tested. Lo-Boy, Hi-Boy, Counter-Flow, Horizontal.

COMPLETE COOLING LINE . . .

- . . . WATERLESS AIRefrigeration with unsurpassed efficiency—featuring exclusive Counter-Flow or Duct Evaporator cooling that requires no additional floor space in a slab perimeter or basement house.
- . . . WATER-COOLED Units that need only 2.7 sq. ft. of floor space.
- DUCT, PIPE AND FITTINGS for any Heating or Cooling System . . . die-cut, pre-fabricated.

Nationally Advertised in . . .

act for profits everyday!

THE WILLIAMSON HEATER CO.
3581 MADISON ROAD, CINCINNATI 9, OHIO

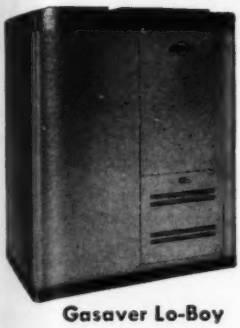
Gentlemen: Rush me details on WILLIAMSON year 'round profits.

Name.....Title.....

Firm.....

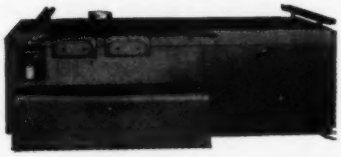
Address.....

City.....Zone.....State.....

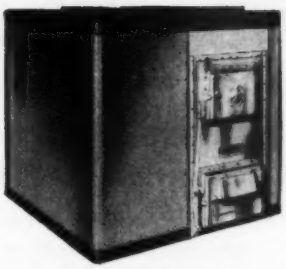


Gasaver Lo-Boy

Oil Flo-Warm Horizontal

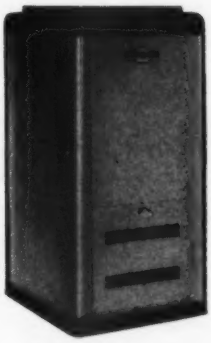


Assembled
Gas Horizontal

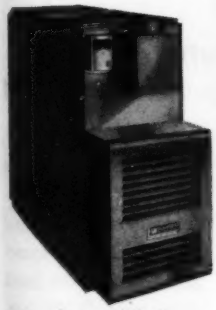


Coal Flo-Warm

Oilsaver Lo-Boy



Gasaver Gravity



Assembled
Gas Lo-Boy

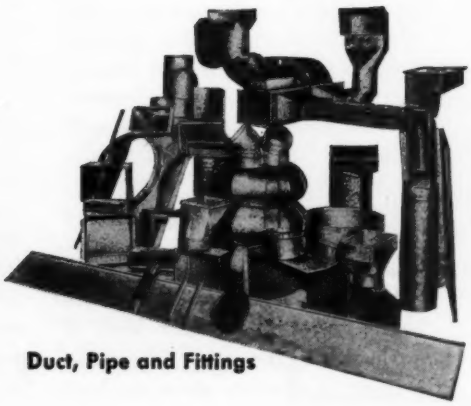
Assembled
Oil Lo-Boy

Assembled
Oil Hi-Boy

Assembled Oil
Counter-Flow

Assembled
Gas Hi-Boy

Gas Flo-Warm Lo-Boy



Duct, Pipe and Fittings

Oil Flo-Warm
Hi-Boy

WASHINGTON LETTER–

(Continued from page 29)

See $40 Billion in New Construction for '55

Recently the Department of Labor issued a statement that two-thirds of the new nonfarm one-family houses have three or more bedrooms according to a nationwide survey. The survey revealed that houses built in '54 are larger than those built in preceding years, with an average floor area of 1140 sq ft. Only 40 percent of the apartment units under construction throughout the country contain more than one bedroom.

The average proposed selling price of the one-family houses is $12,300. In the nation as a whole, one-fourth of the houses now under construction were priced to sell below $10,000; one-tenth were intended for the high-price market above $20,000. Basements were not provided in 60 percent of the houses recently started. It is estimated total volume of new construction this year will come close to $40 billion. This will make ten consecutive years in which the industry established new records. It is interesting to note that the Canadian Embassy reports residential construction in that country also set new records in '54.

Copper, Nickel Exports Placed Under Control

Government as well as the sheet metal and warm air heating industry has closely watched developments in the copper market. Early in February the Bureau of Foreign Commerce of the U. S. Department of Commerce announced that exports of domestic refined copper and copper-base scrap, previously under open-end quota, will be licensed stringently and controlled until further notice. Under new limitations for February and March 1955, a total export quota of 6000 tons has been set for copper-base scrap, and a maximum total of 6000 tons was established for copper-base alloy scrap.

Refined copper of domestic origin will not generally be approved for export. The Bureau of Foreign Commerce stated the new policy was adopted in view of increasing demand "in relation to availabilities." Copper scrap and copper-base alloy scrap quotas are based on exports for a 15 month period, fourth quarter of 1953 through 1954. The news that a higher price was set for copper in London than in New York caused much dissatisfaction in Washington; so did the higher bids made by Germany and others.

Charles F. Honeywell, administrator of the Business and Defense Services Administration of the Department of Commerce, asserted, "It being evident that at least for some time copper will continue to be in short supply, the Department of Commerce has been authorized by the office of Defense Materials to recommend the names of copper consumers and the quantities they may purchase of government-owned or deferred-from-delivery-to-stockpile refined copper. According to the latest report there were 17,500 short tons of refined copper available for sale to consumers. This copper was purchased under authority of the Defense Production Act in connection with the government's copper mining expansion program. About 8,000 short tons of refined copper is also scheduled for delivery to the national stockpile."

Production of refined copper in the third and fourth quarters of 1954 was 54,000 short tons less than anticipated because of strikes. Imports of refined copper into the country likewise fell off sharply because of strikes in Chile and a far greater demand in Europe.

In 1955 the estimated new record in construction activity, increases in new orders for durable goods and stabilized military procurement are hoped to bring a higher level of production in the copper fabricating industry, moderately above the level of 1954. It is hoped there will be a sufficient supply to take care of the anticipated increase in copper consumption in 1955.

Nickel Exports Restricted Too

The Bureau of Foreign Commerce, U. S. Department of Commerce, also announced that nickel-bearing scrap will be further restricted to conserve domestic supplies. Pure nickel scrap and clean nickel-alloy scrap containing 50 percent or more nickel is prohibited for export. Other nickel alloy scrap is on a restrictive or open-end basis; licenses are issued on the applicant's submission of evidence that scrap cannot be used or processed in the United States. A 5 percent increase in domestic consumption of tin in 1955 is estimated over the 56,000 tons consumed in 1954. The international tin agreement is expected to operate immediately, and the stock available is expected to balance world supply and requirements.

Sheet Metal Workers, Equipment Needed

The Bureau of Apprenticeship, U. S. Department of Labor, has just issued a Construction Trades Summary which shows there are a total of 77,268 apprentices of all trades registered. Of this number the latest report shows there are 8343 registered as sheet metal workers. The previous report showed 8159 registered apprentices training in the sheet metal industry.

In an address issued by the Bureau of Apprenticeship, Douglas Whitlock states that 50 percent of those registered will drop out for various reasons. He asserts 77 percent will quit voluntarily; about 18 percent will go into the trades as journeymen; the balance will quit because they need more money, are unsuited for the trade, or for other reasons. Mr. Whitlock says many workers come into the

The houses that sell fastest in '55 will be Air-Conditioned !

That's why you'll have an easy time selling the RHEEM Year 'Rounder, a low cost heating and cooling unit that can make this your best year yet.

In 1955, home buyers will be looking for air-conditioning more and more in the houses they consider.

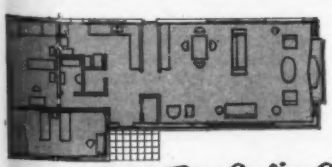
The new low-cost Rheem Year 'Rounder meets this demand best, for it is a highly efficient year-'round air conditioning unit which is suited for homes in almost any price range, even the lowest!

The Year 'Rounder is small enough to be adapted to practically any floor plan. It will be easy for you to sell this unit to builders of single homes and large developments alike.

So sell your builder-customers on the heating-cooling unit that will make more sales for them. For full information write today to Rheem Mfg. Co., 7600 S. Kedzie, Chicago.

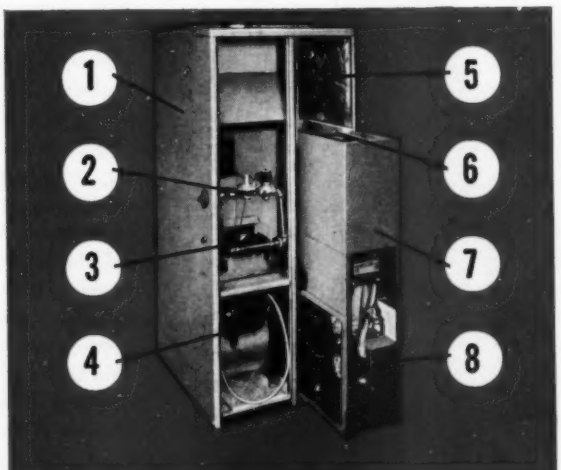
Switch-in-Time, Switch to Rheem

A GREAT NAME IN HEATING AND AIR-CONDITIONING



WHAT IS Zone Cooling?

Zone Cooling means cooling only those rooms that are occupied at a given time—cuts operating costs as well as original investment. The Year 'Rounder is adaptable to this type of service.



1. EMBOSSED STEEL CABINET 2. AUTOMATIC CONTROLS 3. SLOTTED BURNER 4. BALANCED BLOWER 5. SOUND-ABSORBENT PADS 6. TURBO-DRYER COOLING COILS 7. LOW-PRESSURE DROP CONDENSER 8. SEALED REFRIGERANT SYSTEM

WASHINGTON LETTER

trade through the back door, and emphasizes the need for more trained artisans. He suggests careful screening is necessary so the apprentice is guided to the trade best suited to his abilities; he recommends a short probationary period for the apprentice to determine if he likes the trade he chose. Mr. Whitlock thinks careful selection and probationary periods will eliminate the 50 percent drop-out and salvage many young workers for the needs in the skilled trades. He suggests there should be good related instruction and good instructors; and he points out that the age of the apprentice is increasing — The average entering age today is 23, while the average age of apprentices is 26.

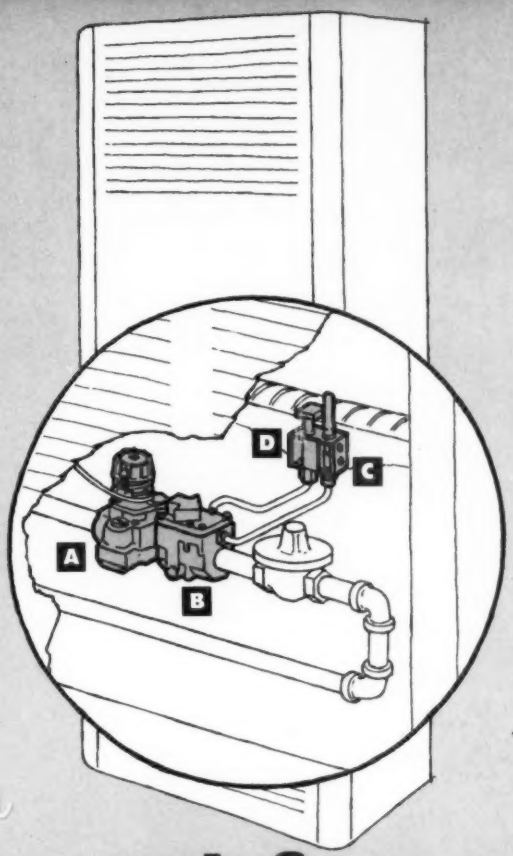
Equipment Also in Demand

The semi-annual shift in leadership of the Metal Working Equipment Division, Business and Defense Services Administration took place at a rally early in February. This division plays a large part in the business of the sheet metal contractors and the warm air heating people in Washington. Ralph R. Baldenhofer is the head of the division.

During the rally a meeting was held which included representatives of the sheet metal contracting and the warm air heating industries and which was launched by Undersecretary of Commerce Walter Williams who outlined the purposes of the series of industry conferences which are held in the Department of Commerce to obtain the viewpoint of business on the many problems of joint government-industry interest. BDSA Administrator Honeywell presided at the conference, with Charles E. Marx, Director of the Metal Working Equipment division as co-chairman. A spokesman for the defense department made the announcement that several hundred million dollars worth of sheet metal equipment will be needed in various parts of the world as well as in this country.

typical all-Honeywell control system

... for gas-fired wall heater



A **Thermostatic Gas Valve, V5151,** Honeywell's Modusnap, provides wall heaters with best automatic features of both snap-action and modulating gas valves. Bulb-and-bellows element furnishes accurate control. Valve snaps open to minimum position on call for heat, then modulates gas flow between minimum and full burner capacity as needed. AGA approved for use with all gases.

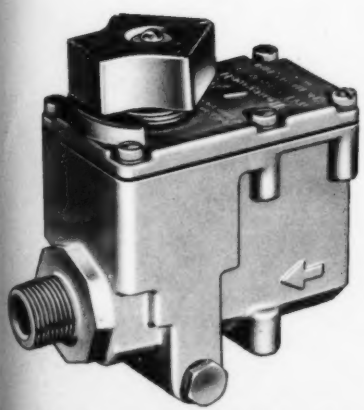
B **Pilotstat, C586.** See description below.

C **Thermocouple, Q235,** when heated by the flame from the Q305 pilot, provides a reliable source of voltage for operation of the C586.

D **Pilot Burner, Q305,** a "single-port" pilot . . . the same flame lights the burner and heats the thermocouple which powers the Pilotstat. Less chance for clogging. A low-BTU burner, too . . . saves money for your customers.

Why it's best to use an

All-Honeywell Control System



Pilotstat, C586, offers 100% shutoff and safe lighting for pilot and main gas outlets. If pilot flame goes out, a spring-loaded valve disc snaps both lines closed and pilot flame must be safely reestablished by hand before either will flow free again. Available with male or female outlets and other optional features. AGA approved.

1. Your installation works better

Every Honeywell control is "system-engineered" to work with other Honeywell controls. This gives you maximum system efficiency.

2. You have the widest choice of controls and systems

Only Honeywell makes control systems for every type of heating plant and for all fuels. When you go all-Honeywell, you get the right system for every job. You're able to rely on *one supplier for all your controls.*

3. You get the best field service in the country

Need help in a hook-up? Puzzled by a performance problem? Your best and nearest answer is your Honeywell wholesaler or branch office. 70 years' experience in controls alone . . . plus the biggest field organization of all . . . puts *more control know-how at your service* from Honeywell than anywhere else in the heating industry.

4. You make more money

You spend less time on service calls, more installing new jobs. And jobs are easier to sell when you tell your customer "I use Honeywell controls throughout." The biggest merchandising and advertising program in the industry means that *Honeywell is the control-name your customer already knows.*

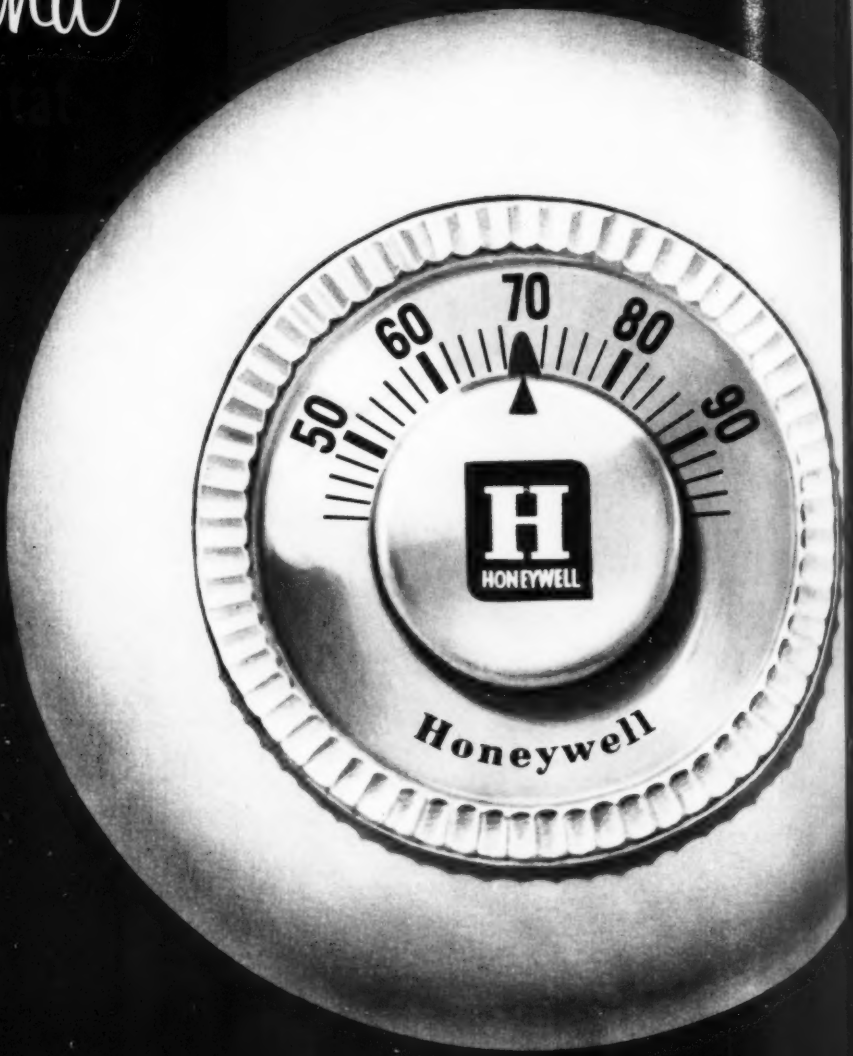
MINNEAPOLIS **Honeywell**

112 OFFICES ACROSS THE NATION

First in Controls

The Honeywell Round

outmodes all others!

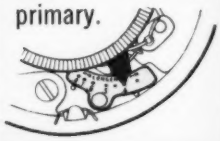


Here's why our Round is our best-selling thermostat...

Cover snaps off . . .

for easy painting to match any wall.

Heater is adjustable to match any primary.



Dust-free mercury switch gives quick, positive switching.

H
HONEYWELL

THE Biggest Stand-Out LINE

IN HEATING . . . COOLING EQUIPMENT IS

Luxaire®

WITH

More Types... More Sizes...

FOR Any Job! AND...

IT'S PRICED TO MEET ANY Competition!

. . . Stands Out
with the COMPLETE LINE

. . . Stands Out
with UNEXCELLED PRODUCTS at LOWER PRICES

. . . Stands Out
in ability to burn GAS or OIL with Equal Efficiency

. . . Stands Out
with Year 'Round Units designed and built with the PRACTICAL APPROACH

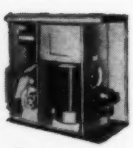
. . . Stands Out
in EASE and ECONOMY of INSTALLATION

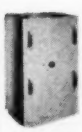
Check your Luxaire Jobber

Get the facts on why Luxaire is the Stand Out profit line — for you!


Front view of Unit with Cover Concealing Burner.


A typical example of a Summer Air Conditioner connected to a Forced Air Unit.


Basement A.C. Units.


Cooling Unit with Blower Section


Counterflow Units


Horizontal Furnaces Gas . . . Oil


Incinerators


Gas Conversion Burners


Gas Unit Heaters


Utility Units


Gravity Furnaces

THE C. A. OLSEN MANUFACTURING COMPANY • • ELYRIA, OHIO

Luxaire® HEATING & AIR CONDITIONING UNITS

WHY dealers call Worthington air conditioning equipment "the contractor's line"

✓ Unit for every job—and pocketbook!

✓ No call-backs! ✓ Sales-building national ads!

With the *completeness* of the Worthington line, Worthington dealers can handle *any* air conditioning problem. From year-round air conditioners to high-style window units—Worthington has them all!

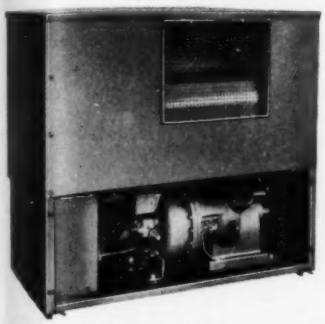
And when you install Worthington air conditioning or heating equipment, you can forget about it. It'll do a job—and *keep* doing it. Dependability like that is worth money to you and every contractor.

Contractors also like the bang-up national advertising job Worthington's doing. This big-money campaign reaches every corner of the air conditioning market via BUSINESS WEEK, NATION'S BUSINESS, SMALL HOMES GUIDE, HOUSE BEAUTIFUL, and HOUSE AND GARDEN—and it's all backed-up by a full line of dealer aids.

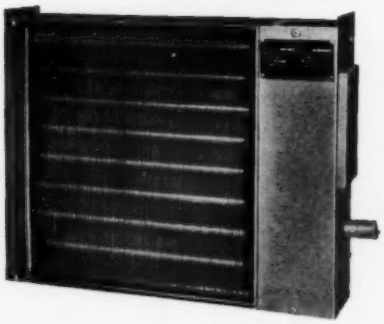
"The contractor's line"? You can say *that* again!

A.5.65

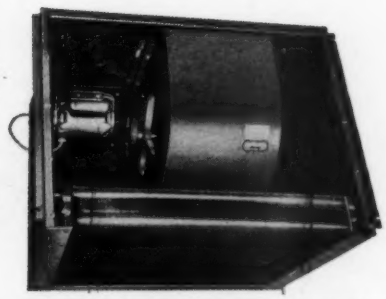
Meet 3 newcomers in Worthington's air-cooled line!



WORTHINGTON'S BRAND-NEW AIR-COOLED CONDENSING UNIT. Install it anywhere—outdoors, breezeway, garage, basement. *All electric—no water used.* It'll do an efficient job in even the hottest weather because of powerful condenser air-blowers. 2-, 3-, and 5-hp.

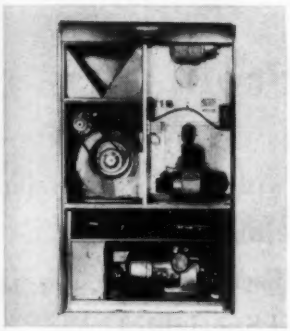


COMPANION COOLING COILS. Worthington's new broad line of Remote Duct Cooling Coils provides you with a wide range of capacities and sizes that will simplify your application and installation problems. Light-weight, easy-to-install unit is available in 2-, 3- and 5-ton capacities.



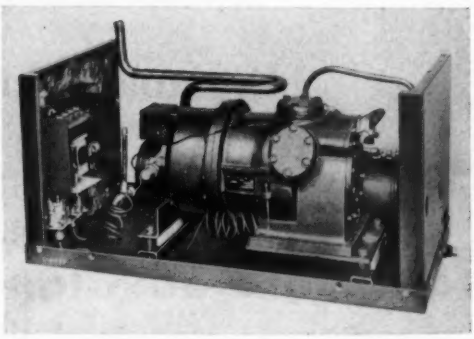
AIR-COOLED CONDENSERS. These new Worthington units feature over-sized condenser coils; powerful, quiet condenser air-blowers; continuous-duty blower motors; weather-proof cabinet. They convert water-cooled air conditioning units to air-cooled operation. 2-, 3- and 5-ton capacities.

Look at these other Worthington units!



WORTHINGTON'S COMPACT YEAR-ROUND UNIT measures only 29″ deep x 42″ wide x 70″ high. Ceramic-coated heat exchanger, gas or oil-firing. Completely automatic summer and winter operation.

"ADD-ON" RESIDENTIAL COOLING UNITS convert present warm air furnaces to year-round cooling and heating. When additional air delivery is needed, fan section shown on top of unit is used. 3- and 5-ton sizes.



WATER-COOLED CONDENSING UNITS. Worthington's packaged water-cooled condensing unit fits anywhere—closet, basement, attic, even in the garage. Compressor, condenser, and controls come in one compact cabinet. Use it with Worthington's Remote Duct Cooling Coil, for existing homes or new construction. Available in 3- and 5-ton capacities.

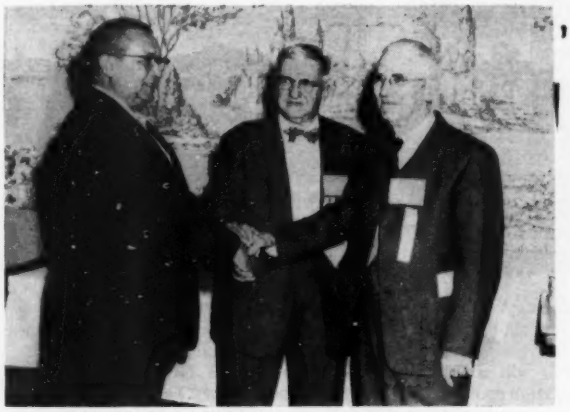
GAS-FIRED BOILER. Sectional cast iron, AGA approved for all gases. Enclosed in handsome cabinet. Readily suited for use with heating coils in packaged units for year-round application. 54,000 to 378,000 BTU input.

Want to know more about Worthington's complete residential equipment? Write to Worthington Corporation, Air Conditioning and Refrigeration Division, Section A.5.65, Harrison, N. J.

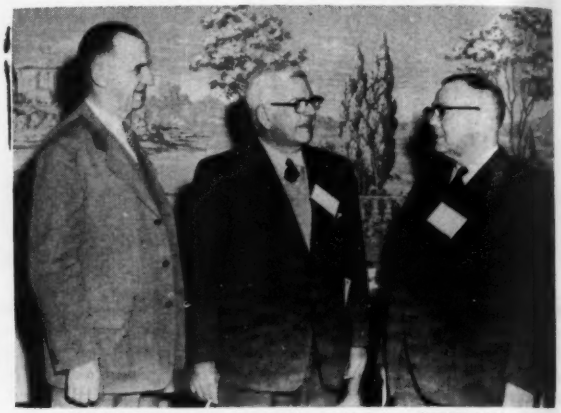
See the Worthington Corporation Exhibit in New York City. A lively, informative display of product developments for industry, business and the home. Park Avenue and 41st Street.

WORTHINGTON

The Best Franchise . . . The Most Complete Line



CONGRATULATIONS are extended by Russell A. Harris to Homer Selch and Frank E. Anderson, who were awarded life memberships in the Indiana contractors' association



PROFESSORS Merle McClure *(left)* and Bill Miller discuss details of the College Short Course with Dean Lorin G. Miller of the National Warm Air Heating and Air Conditioning Association

Indiana Dealers Plan for Profits

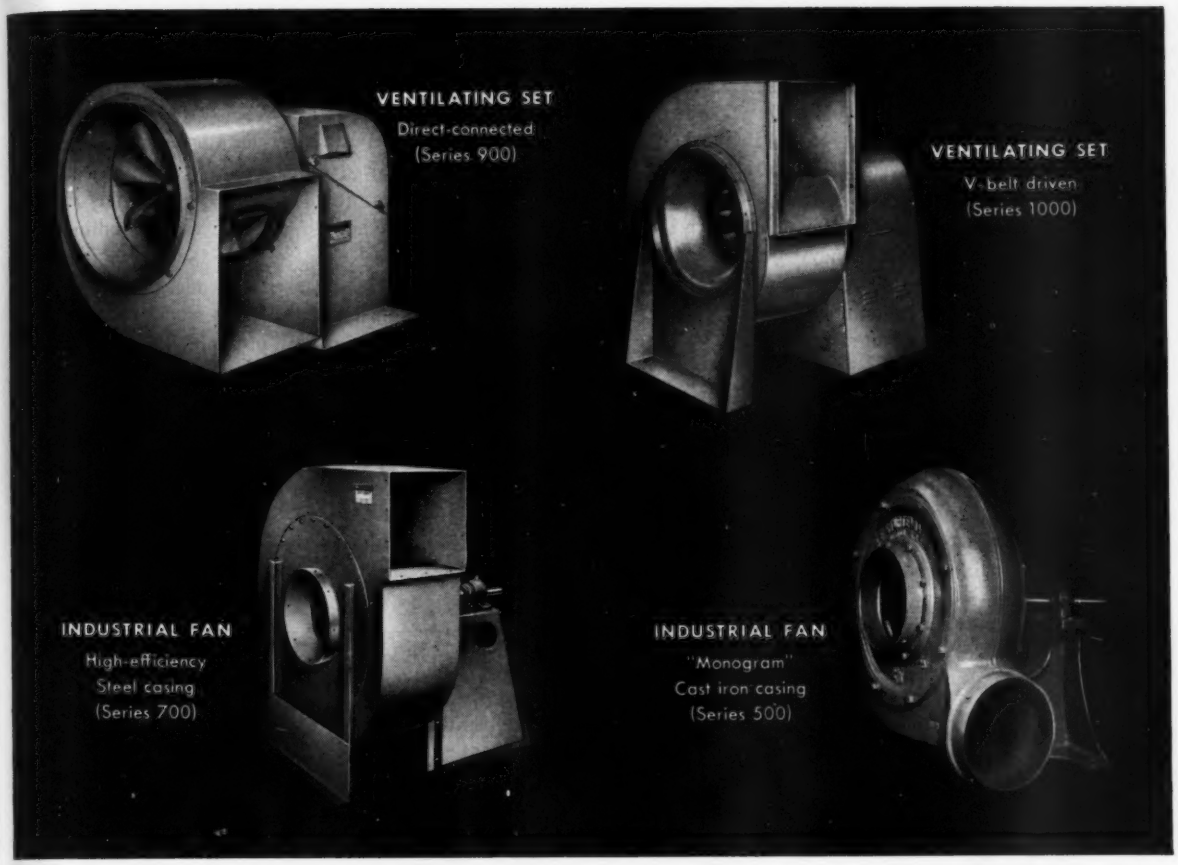
- **By Heating Large Buildings with Warm Air Systems**
- **By Installing Residential Cooling Systems**
- **By Improving Management Techniques**
- **By Fabricating Stainless Steel Specialties**

SOME EFFECTIVE ways to meet current needs of the warm air heating, residential air conditioning and sheet metal contracting business were presented at the 37th annual convention of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana held on February 3 to 4 at Indianapolis. The business portion of the meeting saw the reelection of Russell A. Harris as president, Don McCloskey as first vice president, Z. V. Hazelton as second vice president, J. R. Walker as treasurer and Frank E. Anderson as secretary. Directors elected for two year terms were Harold D. Boyd, William E. Garber, Jr., Maxwell Goff and H. W. Meggs. Directors with one year remaining to serve are H. M. Daily, J. W. Ridgway, T. B. Speaker and L. W. Widney.

One of the highlights of the meeting was the awarding of life memberships to Frank E. Anderson and Homer Selch and honorary memberships to Professor W. T. (Bill) Miller and Guy Voorhees for outstanding services rendered to the association for many years.

The application of warm air heating systems to large buildings was described by Dean Lorin G. Miller, technical consultant to the National Warm Air Heating and Air Conditioning Association. Dean Miller pointed out the importance of selecting perimeter diffusers with enough discharge velocity to adequately blanket the higher walls found in commercial buildings as well as the use of dual duct systems for school house heating in order to apportion the heated air with the unheated ventilation supply. This method has proven to be a most suitable way to meet the varying internal heating load problems encountered in schoolrooms, according to Dean Miller.

Residential air conditioning was covered in two programs. Professor W. T. Miller of Purdue University described the function of the refrigeration system and explained the importance of selecting a residential cooling unit which will operate constantly during peak outside temperature conditions and on long running cycles at other times. The second program on residential air conditioning consisted of an open forum during which the audience asked pertinent



These Westinghouse Fans Help You Increase Production . . . Employee Efficiency

Whatever your air handling problem . . . smoke, fumes, vapor, dust, wood shavings, granular material or ventilating . . . these Westinghouse fans are designed to handle or remove them . . . efficiently and economically.

INDUSTRIAL FANS (SERIES 700) . . . for dust collecting and conveying at high pressure. Wide range of capacities. Three types of wheels in 11 sizes.

1. Air Handling Wheel . . . particularly adaptable for general air handling and exhaust systems in removal of smoke, fumes and gases.

2. Material Handling Wheel . . . designed specifically for grinding and buffing wheel systems, and conveying materials such as chips, sawdust and grains.

3. Long Shaving Wheel . . . handles long fibrous materials that pass through the fan itself: trimmings from corrugated boxes, alfalfa, long shavings from woodworking machinery, rags, others.

INDUSTRIAL FANS (SERIES 500—MONOGRAM) . . . ruggedly built, with cast iron casing. For use as a blower or exhaust or for dust control, collecting and conveying waste or raw materials, supplying air for furnace blast, drying, etc. Provides long, trouble-free service at low cost under severest operating conditions. In 10 sizes with wide range of capacity.

SERIES 900 VENTILATING SETS . . . compact, efficient, direct-connected and ready-to-run. Especially suited for small ventilating installations. Cleanable radial blade wheel design minimizes problem of handling airborne dirt and grease. Six sizes from 6" to 15" wheel diameters.

SERIES 1000 VENTILATING SETS . . . V-belt driven, self-contained. Install indoors or outdoors in a wide variety of heating, ventilating or air conditioning applications. Twelve sizes from 9" to 30" wheel diameters.

These rugged, powerful Westinghouse fans provide the most economical solution to your specific air handling problem. And Westinghouse fans offer a *single equipment warranty* with undivided responsibility . . . an *exclusive* Westinghouse-Sturtevant feature. Get the facts today on the fan built for *your* need from your nearest Westinghouse-Sturtevant office. Or write: Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

WESTINGHOUSE AIR HANDLING

J-80380B

YOU CAN BE SURE...IF IT'S Westinghouse

WITH THE ASSOCIATIONS

(Continued)

questions of a panel made up of T. B. Speaker, Lafayette dealer who served as moderator; Gil W. Denges, Williamson Heater Co.; J. W. Ridgway, Frankfort dealer; Howard Shaefer, York Corp.; Walter M. Enoch, Minneapolis-Honeywell Regulator Co.; Clyde M. Barnes, American Artisan; Edwin A. Scott, Jr., Heating, Air Conditioning and Sheet Metal Contractor; and Ed Carter, Snips.

The bulk of the questions involved selecting and operating water cooled and air cooled condensing units. The panel's recommendations usually were that the dealer's choice be based upon the factors involved at each individual location.

Business management techniques were reviewed by R. F. Horan, merchandising manager, Perfex Corp., who outlined such outstanding problems of dealer management as overhead, pricing, collections and discounts. Mr. Horan treated each subject as fully as time permitted, leaving the dealers with excellent ideas on how to improve their handling of business problems.

Stainless steel, its history and development to a place of importance in the sheet metal contracting field, was shown in a film presented by Edgar N. Rhodes, Jr., Hubbell Metals, Inc. The film, produced by Republic Steel Corp., described the 30 types of stainless steel and explained how best to use the type most suited for a particular job. The film pointed out that stainless steel has nine times as many uses today as it had 15 years ago, whereas other types of steel have only two and a half times as many.

(*More association news on page* 44)

Coming Events

Mar. 25-26—Sheet Metal, Air Conditioning & Roofing Contractors' Association of Pennsylvania, annual convention. Brodhead Hotel, Beaver Falls. Earl W. Liebermann, Secretary, 1411 Merchant St., Ambridge, Pa.

Mar. 28-31—Michigan State College Short Course. Professor R. J. Waalkes, Department of Mechanical Engineering, Michigan State College, East Lansing, Mich.

Mar. 30-31—Albuquerque Indoor Comfort Conference. J. H. Smith, Chairman, 612 N. First St., Albuquerque.

Apr. 4-5—Omaha Indoor Comfort Conference. L. C. Norton, Chairman, 1201 Dodge St., Omaha 8.

Apr. 7-8—Davenport Indoor Comfort Conference. E. Adolphi, Chairman, Federal & Charlotte Sts., Davenport, Ia.

Apr. 11-12—Madison Indoor Comfort Conference. C. W. Vaughn, Chairman, 1806 South Park St., Madison 5, Wis.

Apr. 14-15—Duluth Indoor Comfort Conference. J. P. Nelson, Chairman, 309-49 S. 5th Ave., W., Duluth, Minn.

Apr. 15-16—Roofing and Sheet Metal Contractors' Association of Florida, annual convention. George Washington Hotel, Jacksonville, Fla. Mrs. Anne White, Executive Secretary, Route 5, Box 470, Jacksonville.

Apr. 18-19—Fargo Indoor Comfort Conference. R. E. Hartke, Chairman, 92 Northern Pacific Ave., Fargo, N. D.

Apr. 18-21—Iowa State College Short Course. Professor Marvin Gould, Engineering Extension Service, Iowa State College, Station A, Ames, Ia.

Apr. 19-21—Oil-Heat Institute, annual convention. Conrad Hilton Hotel, Chicago. R. H. L. Becker, Managing Director, 500 5th Ave., New York 36.

Apr. 24-27—National Heating Wholesalers Association, spring meeting. Paradise Inn, Phoenix. A. G. Earnshaw, Secretary, 210 N. Willis Ave., Mansfield, O.

Apr. 24-27—Sheet Metal Contractors Association of Illinois, Inc., annual convention. Pere Marquette Hotel, Peoria. Jay E. Harms, Secretary. 1619 N. Sheridan Rd., Peoria.

Apr. 27-30—Sheet Metal Contractors' National Association, annual convention. Mark Hopkins Hotel, San Francisco. J. D. Wilder, Executive Secretary, 170 Division St., Elgin, Ill.

Apr. 28-29—Hartford Indoor Comfort Conference. C. W. Thomas, Chairman, 133 Laurel St., Harford 6. Conn.

June 7-10—Eastern Biennial Exposition of Oil Heat and Domestic Cooling. Hotel Statler, Boston. Thomas G. Colter, Chairman, Oil Heat Institute of New England, 839 Beacon St., Boston 15.

you have a

HOT OPPORTUNITY

DAY & NIGHT *Lifeguard* Forced-air Heat

For the golden opportunity of the replacement market – for the custom-built new home – for the merchandising builder who wants a special feature to put him ahead of competition – Day & Night's Lifeguard Furnace gives you a story of unique quality, double safety, and triple comfort that no one else can match. When price becomes a problem Day & Night's Master Furnaces give you value that gets the job. Both beautifully styled – in horizontal, upflow, or downflow designs.

for a

COOL PROFIT

DAY & NIGHT Refreshair Conditioning

Puts you in business to cover *every* need in the biggest selling opportunity of the future – residential air-conditioning. Yes, *every need* – space-saving remote units, hide-away self-contained units, add-on package units – and economical zone-cooling designs that bring the luxury of summer comfort to the average home. Sizes: 1½, 2, 3, 5 tons. Water cooled, or air-cooled.

all year long

For such an opportunity, you need a line that covers every base—a complete line – a line that gets you the competitive business profitably – a line that gets you the even more profitable quality business – in short, the Day & Night line. The first step – write for complete information and the name of your nearest Day & Night distributor.

when you sell

DAY & NIGHT

MANUFACTURERS OF AMERICA'S FINEST AIR-CONDITIONING, HEATING, AND WATER HEATING EQUIPMENT

© DAY & NIGHT, MONROVIA, CALIFORNIA

Every day more dealers say—it pays to sell the best

OFFICERS and directors of the New York state association: seated (*from left*) are Irving G. Spalty, F. V. Pils, Clarence J. Meyer, Richard Friday, and Richard Millard. Standing (*from left*) are directors William C. Schmitt, Jr., William Nolder, Richard H. Machemer, Charles E. Sperlik, George Ballard, Jr., Peter Sturr and Percy Sullivan

THE NEW YORK STATE association places particular emphasis on its apprentice training program. Above, members of the apprenticeship committee examine a few of the 285 entries submitted in this year's contest. The judges are (*l. to r.*) William C. Schmitt, John J. Yager, Joseph R. Stiglmeier and William Steinhorst

New York State Contractors Build Promising Future

. . . based on an effective apprentice plan, rising sales curves, new equipment and easing of jurisdictional disputes

A FIRM BELIEF in the growing demand for the services of the air conditioning dealer and sheet metal contractor was very much in evidence at the 32nd annual convention of the New York State Sheet Metal, Roofing and Air Conditioning Contractors' Association in Elmira, January 23 to 26.

One of the outstanding achievements of this group during the past year has been the development of better apprentices through a contest based on the amount of experience an apprentice has received in the closely supervised training program. This year 285 entries vied for prizes in the first, second, third and fourth year classifications. The 1956 contest is expected to attract about twice as many entries due to the interest shown by the contractors and union representatives working in the New York City area.

Winners of this year's awards are:

First year — John Kinyon, Albany
Second year — John Theil, Buffalo
Third year — Walter Tomezyk, Buffalo
Fourth year — F. Norton, Albany

The apprenticeship contest and training program were under the chairmanship of Joseph R. Stiglmeier of Buffalo.

Other evidence of the association's confidence in the future is indicated by the youthful slate of officers elected. F. Van Pils was named president; Irving Spalty, first vice president; and Richard Millard, second vice president. Re-elected were Secretary Clarence J. Meyer and Treasurer William C. Kirkpatrick. Elected to the board of directors for three year terms were Frank Cashier, Syracuse; Charles R. Joyce, Albany; and Richard H. Machemer, Elmira.

The newest business potential in the fields served by warm air heating dealers and sheet metal contractors is the residential cooling market, according to W. W. Woodroof, manager of cooling sales, American-Standard Corp., Sunbeam Air Conditioner Div. Mr. Woodroof showed a business graph on which the sales potentials of heating and cooling equipment were charted in dollar volume.

The curve for the value of heating equipment to

be sold in 1959 showed approximately $700 million. The curve for summer cooling equipment crossed the heating equipment curve at this point, indicating that the market for 1959 would be in the neighborhood of $1½ billion. The summer cooling equipment curve moved rapidly to higher levels after the year 1959, whereas the heating curve indicated a slight rise each year due to the number of new homes being built.

Tools of the future were discussed by F. R. House, welding engineer, Westinghouse Electric Corp. Mr. House told about the recent development in welding equipment and techniques, pointing to the favorable acceptance of the heli-arc welding process by more and more sheet metal contractors.

The Sheet Metal Contractors' National Association had two representatives on the program — A. J. Sabathne, immediate past president, and Joseph D. Wilder, executive secretary. Mr. Sabathne outlined the advantages of chapter membership in the national association and explained how architects' allocation of sheet metal work to the proper specifications was giving more work to the sheet metal field, "where it belonged in the first place." This achievement, he said, had been brought about by the joint efforts of the local secretary and the national office.

Mr. Wilder spoke on the problems involved in jurisdictional disputes with other trades and how — through representative membership on the National Joint Board for the Settlement of Jurisdictional Disputes — the sheet metal contractor is protected where the sale and installation of equipment might be challenged by other business groups.

PROS AND CONS of hiring an executive secretary are considered by panel (from left): Clyde E. Parriott, Walker Jamar, Ray J. Kraus and Howard Camitsch

CONGRATULATIONS are exchanged by Ray Kraus, retiring president of the association, and his successor, Walter A. Swenberg.

Minnesota Group Wages Jurisdictional Battle

. . . and chalks up a string of victories

THE NINTH annual convention of the Sheet Metal and Roofing Contractors Association of Minnesota drew a total registration of 157, including 51 contractor-members, February 10-12 at the Lowry Hotel, St. Paul.

Those who battled icy roads and sub-zero temperatures were rewarded by energetic business sessions and discussions largely devoted to the association's activities in jurisdictional disputes and to weighing the possibilities of hiring a full time manager.

Liveliest event on the program was the business session on the last day, which was sparked by discussion of jurisdictional disputes in which the association had taken part collectively and individually.

Reports indicated a battle between the United Association of plumbers and pipe fitters and the master plumbers association on the one side and Sheet Metal Workers International Association, Local No. 76 of St. Paul and the Roofing and Sheet Metal Contractors' Association of St. Paul on the other, for jurisdiction over the furnishing and installing of air handling equipment. Edwin C. Winter, business agent for the local, described the pipe fitters' actions as a "raid on the industry" basing his claims on a decision rendered in 1918 and reaffirmed in 1920 by agreement between the Amalgamated Sheet Metal Workers' International Alliance and the United Association of

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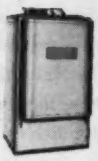
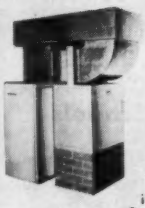
Year 'Round Air Conditioner equipped for Gas.

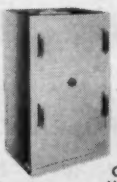


Year 'Round Air Conditioner with attractive vestibule.

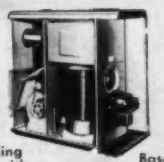
Same Unit equipped with Oil Burner.



A Summer Air Conditioner installed with a Forced Air Furnace.



Cooling Unit with integral Blower



Basement A-C Unit. Gas or Oil

Counterflow Unit Gas or Oil

Utility Unit Gas or Oil

Gravity Furnace

ncinerators . . . with or without gas burner

Horizontal Furnace Gas or Oil.

Gas Unit Heaters

IT'S *Built Right* IT'S *Priced Right*

There's a popular slogan that says, "You can pay more, but you can't buy better!" And never was it more true than when applied to the complete Moncrief line!

For, in Moncrief, you have a line that's not only priced right, but it's engineered and manufactured by the most experienced people in the furnace business. 60 years of furnace manufacturing background are applied, today, with every modern technique to provide you with a size and type of unit for any application — for speedier, less troublesome installations.

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The up-to-date way to make better, more economical installations is with Moncrief Snap Lock Pipe, Duct, Stack and Fittings. Machine fabrication in our mechanized shop means lower prices. Ingenious Snap Lock means easier handling, surer joints. And they're Carton-Packed for protection in shipment and storage.

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THE HENRY FURNACE COMPANY • *Medina, Ohio*

HEATING AND AIR CONDITIONING UNITS — MONCRIEF — FURNACE PIPE AND FITTINGS

plumbers and steamfitters. The agreement, which has won every decision sought by the sheet metal contractors and union, reads as follows:

"*Section 1* — That all sheet metal work of No. 10 gage or lighter, when used in air washers, fans, blowers, or on the housing of same, shall be recognized as being the work of the members of the Amalgamated Sheet Metal Workers' International Alliance.

"*Section 2* — That all pipe fitting in connection with the above first section shall be recognized as being the work of the steamfitters, members of the United Association of journeymen plumbers, steamfitters and steamfitters' helpers.

"*Section 3* — It being thoroughly understood by all of the undersigned that all the assembling and erecting of the work as defined in Section 1 shall be the work of the members of the Sheet Metal Workers' International Alliance, excepting pipe fitting of all kinds, which shall be the work of the steamfitters and steamfitters' helpers of the United Association.

"*Section 4* — This agreement shall become effective and in full operation for all parties concerned beginning November 1, 1918."

The agreement was signed by officials and representatives of both groups.

Association members recommended use of the agreement by other associations and unions experiencing the same difficulties.

Officers elected for 1955 are Walter A. Swenberg, president; Al Lassila, vice president; Rugar Keehn, secretary; Fred Kuettel, Jr., treasurer; Ray Hershey, sergeant-at-arms. Directors named for two year terms are Willard Aarens, Dave Diamond and Harold Ofenloch.

The program of speakers was led off by a delegation headed by Joseph Robbins, Peoples Division, Northern Natural Gas Co., Omaha. Assisted by Larry Potter and Jud Hanson of the same company, Mr. Robbins described the company's efforts to serve outlying districts in Minnesota with natural gas in his talk, "Future of Gas Warm Air Heating in Rural Minnesota." The speakers diagrammed a pipe line extending from Canada (where the company has contracted for a trillion cu ft of natural gas) to a point below the Twin Cities, and outlined plans to serve most of rural Minnesota and other states within the next few years. A color film showed the advantages to farmers of being able to tap gas lines on their property.

Walter Kofski, CPA, discussed "Management of a Sheet Metal or Roofing Contracting Business" from a standpoint of maintaining uniform accounting systems, and urged the association to develop a pattern system for members to follow.

Otto F. Christenson, Minnesota Employers Association, spoke on "Importance of Trade Association Affiliation in Modern Business," listing as some of the functions of trade associations the development and maintenance of fair competitive methods, aid and protection to members, transmission of government information and legal actions affecting the trade, representation of the trade in government and before the public, and obtaining of consumer acceptance for the trade's products and services. Defining trade associations as "people working together," Mr. Christenson emphasized "the passing of the day of individualism" and stressed that results are achieved only by collective power, which is a product of open and legal development of fair competition.

A panel comprised of President Ray Kraus, Clyde E. Parriott, Walker Jamar and Howard Camitsch, executive secretary of the Minneapolis Sheet Metal and Roofing Employers Association, gave recommendations and advice on hiring a full-time executive secretary. Mr. Parriott reported on the steps taken by the St. Paul association in hiring a manager; he was followed by Mr. Camitsch, who reported an entirely different approach taken by the Minneapolis group. The discussion ended with a motion to consider hiring a secretary, and was later tabled to be taken up by the new board of directors.

The convention closed February 12 with committee and officers' reports and election and installation of new officers.

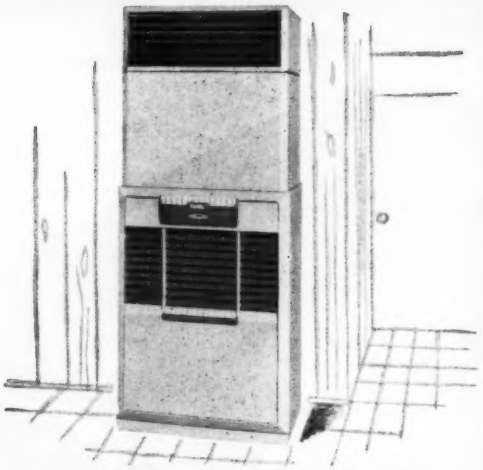
Ohio Group Opens Cooling Schools

THE COLUMBUS SHEET METAL, Furnace and Air Conditioning Association has started a cooling school which will cover all phases of residential cooling — heat gains, selling, service, etc. Representatives from General Electric Co., Frigidaire Division of General Motors Corp., Westinghouse Electric Corp., Carrier Corp. and other manufacturers are scheduled to present details and operating characteristics of their equipment.

Receive Awards for Safety

THE MASTER SHEET METAL, Furnace and Roofers' Association (Rochester, N. Y.) reports that six of its members were named to receive awards for safety by the safety committee of the New York State Sheet Metal, Roofing and Air Conditioning Contractors' Association at the recent state convention. Members who received the awards are Nick Testa, Burt Stevens, E. J. Barner, John Betlem, Orville Brandt and Richard W. Friday.

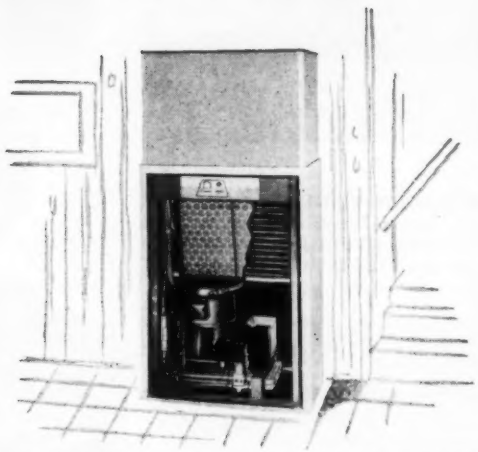
MITCHELL . . . YOUR BIGGEST SALES OPPORTUNITY IN PACKAGED AIR CONDITIONERS



COMMERCIAL AIR CONDITIONER

2, 3, 5 & 7½ Ton Air and Water Cooled

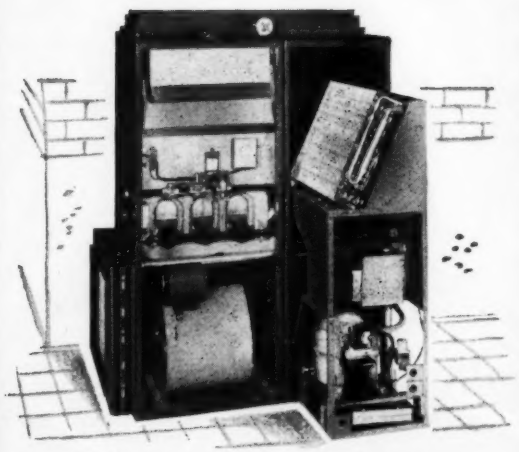
Ideal for commercial and industrial air conditioning. Includes hermetic refrigeration chassis, powerful blower section and air distribution plenum.



RESIDENTIAL ADD-ON AIR CONDITIONER

2, 3 & 5 Ton Air and Water Cooled

Converts present warm air heating system to a year 'round air conditioning system with this powerful Mitchell Add-On unit.



YEAR 'ROUND AIR CONDITIONING

1½, 2 & 3 Ton Air and Water Cooled with Gas Fired Furnaces from 70,000 to 150,000 BTU/hr.

For new construction and the replacement furnace market, these powerful year 'round air conditioners are versatile, compact, easy to install . . . the easiest to service.

It pays to tie-in with MITCHELL the *accepted* name in air conditioning

If you are an experienced Air Conditioning Contractor with an organization that can sell, install and service both commercial and residential air conditioners, Mitchell offers you a fabulous opportunity with a Direct Factory Franchise. *Write today* on your letterhead for complete information and literature.

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Powerful new G-E sha
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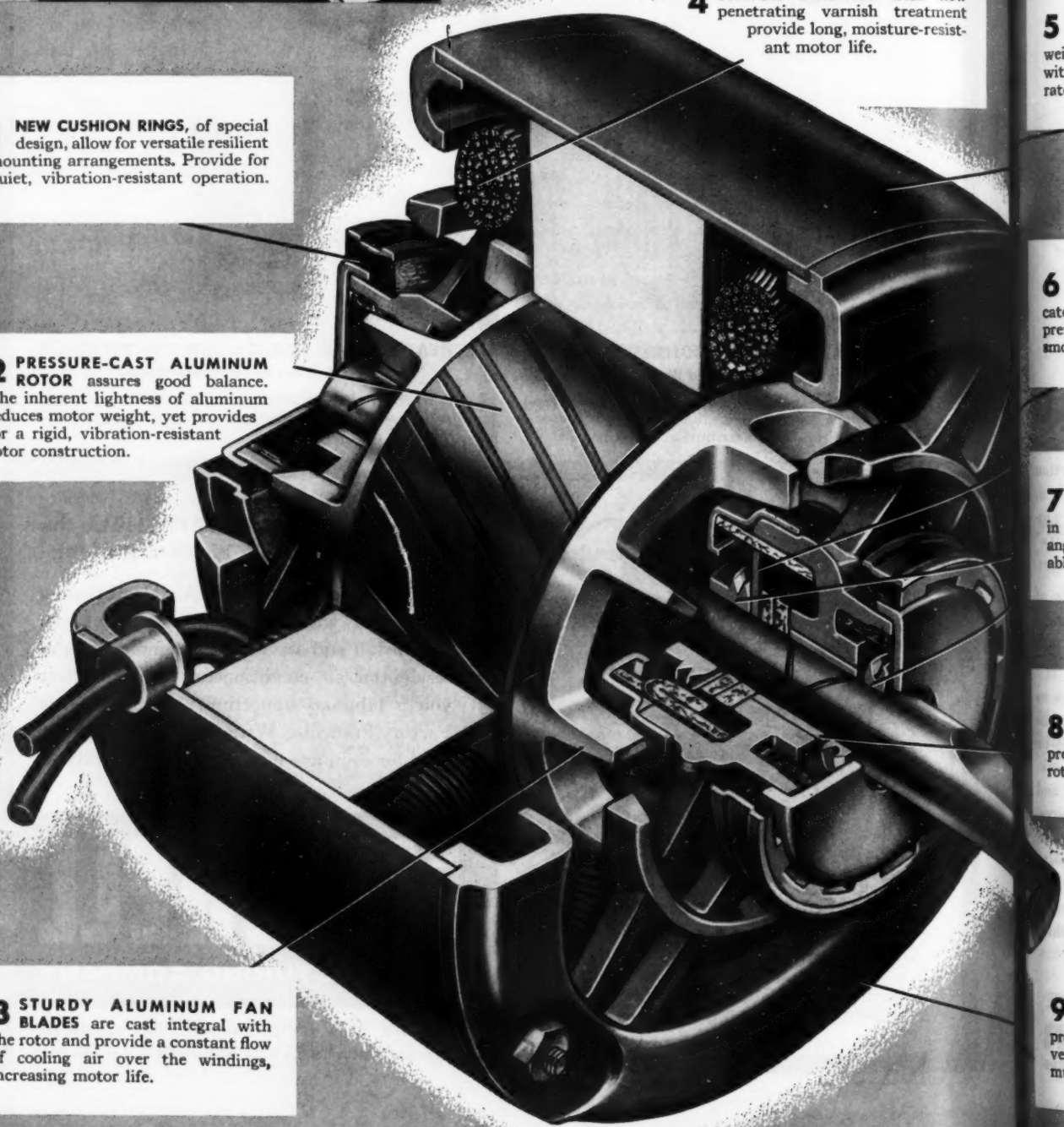
1 NEW CUSHION RINGS, of special design, allow for versatile resilient mounting arrangements. Provide for quiet, vibration-resistant operation.

2 PRESSURE-CAST ALUMINUM ROTOR assures good balance. The inherent lightness of aluminum reduces motor weight, yet provides for a rigid, vibration-resistant rotor construction.

3 STURDY ALUMINUM FAN BLADES are cast integral with the rotor and provide a constant flow of cooling air over the windings, increasing motor life.

4 STATOR WINDINGS with new penetrating varnish treatment provide long, moisture-resistant motor life.



shaded-pole motors have all for better blower performance

5 SHELL-TYPE CONSTRUCTION makes possible a short, lightweight, double-end ventilated motor with internal cooling fans and accurate rotor alignment.

6 PRELOADED THRUST BEARINGS of high capacity design are located at each end of the shaft. They prevent end bump and assure smooth, quiet operation.

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8 SLEEVE BEARINGS are babbitt-lined and steel-backed. They are precision machined for accurate rotor alignment.

9 END CASTINGS of new design are sturdily constructed and assure precise bearing alignment. Generous ventilating openings provide optimum cooling.

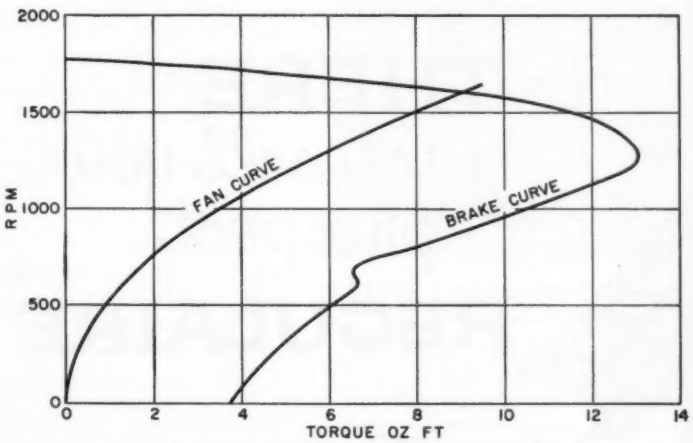
1/12 THRU 1/4 HP RATINGS MEET NEEDS OF FURNACES UP TO 115,000 BTU OUTPUT

The many advanced features of General Electric's new 1/12 thru ¼ hp shaded-pole motors now offer furnace-blower designers improved blower performance, cost savings, and an opportunity to streamline blower design.

SPECIALLY DESIGNED for furnaces through 115,000 BTU, these new G-E motors make possible all of the benefits of direct drive: simplified design, reduced noise, elimination of pulleys, belts, and blower-wheel shaft and outboard bearings. Small, compact design saves valuable space, cuts over-all blower size with resulting savings in material and shipping costs.

HIGH EFFICIENCY—highest yet attained on a motor of this type—and better dip torque characteristics for higher full-load speeds assure better blower performance. Reduced blower maintenance results from a recirculating oil retention system which eliminates need for re-oiling.

YOU CAN SAVE on furnace-blower design by making sure your new models are equipped with these powerful new G-E motors. Available ratings include four-pole (1550 rpm) and six-pole (1050 rpm) models, reversible and non-reversible. For full details on all G-E shaded-pole motors from 1.5 watts thru ¼ hp, contact your nearby G-E Apparatus Sales Office today. Write for Bulletin GEA-6134 to General Electric Co., Sect. 704–43, Schenectady 5, N. Y.



HIGH DIP TORQUE—new, more powerful G-E shaded-pole motor has high dip torque which makes possible dependable, multi-speed operation and speed stability at all speeds.

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FULL-TIME COMFORT—that's what your customers really want. Perfection furnaces with Regulaire guarantee it. No more hot and cold blasts, chilly intervals, drafty floors or the "cold 70's" that go with ordinary off-on furnaces.

Regulaire utilizes the principle of Constant Air Circulation, delivering a smooth continuous floor of warmth for all-over comfort, all the time.

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AUTOMATIC HEATING • AIR CONDITIONING

Installing Monel Gutter under expansion dams at the north abutment of the Ninety-Sixth Street overpass on the F. D. Roosevelt Drive along the East River in New York City. Although relatively thin .062" sheet was used, the gutters have ample strength to withstand deformation during installation . . . and abrasion and flexure *after* installation.

Nice work... and you can get it!

What's going on here? These men are putting Monel® gutters under a new highway overpass.

This is just one example of the many Monel jobs let recently.

Are you getting Monel jobs yourself? You should be. More and more architects are specifying Monel for sheet metal work. All kinds of sheet metal work.

Don't pass up a single job that calls for Monel even if you've never worked with it. Get a bid in! Good workmanship in Monel is hardly different from what it is in any roofing metal.

Monel Roofing Sheet, in fact, has a special soft temper. This makes it easy to work with. You can shear the sheet and handle it readily with brakes and other tools. For neatly soldered joints, you pre-tin sheet edges in your shop. Use a heavy, hot iron for installation. Gives you a tight, perfect seam every time! Or if the job calls for welded joints (as this overpass job did) you can do it readily by either gas or electric welding.

So go out after those Monel jobs! On overpasses... city buildings... office buildings... schools... churches... factories... even private homes.

Find out — now — how easy it is to handle Monel like a veteran. Write for our helpful bulletins, "Monel Roofing Sheet — Basic Application Data" and "Soft Soldering of Monel Roofing Sheet." They're free. And you don't have to write a letter. A post card asking for "Monel Roofing Sheet bulletins" will do fine. Get it off to us today.

The INTERNATIONAL NICKEL COMPANY, Inc.
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Existing Road Improved. Here is how the new overpass looks from a nearby building. The elevated roadway is typical of much new construction designed to speed traffic flow. Monel was specified for gutters because a long-wearing, low-maintenance metal was desired. (Work performed for Triborough Bridge & Tunnel Authority, BROWN & BLAUVELT, consulting engineers.)

INCO Nickel Alloys
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Monel Roofing . . . *"for the life of the building"*

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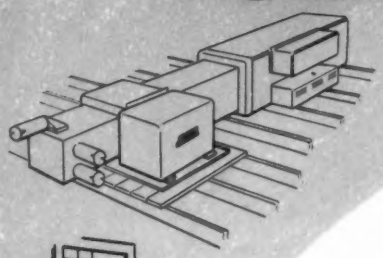

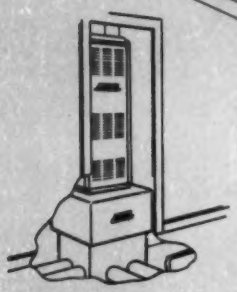

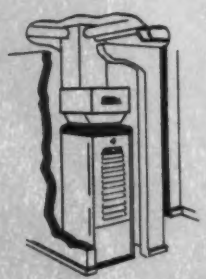

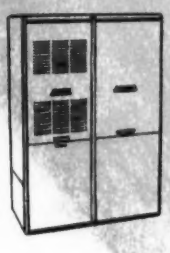

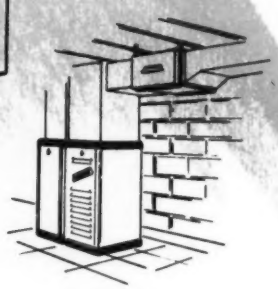

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- **Both water cooled and air cooled models to sell.**
- **Single package and remote systems—for use alone or with forced air heating systems.**
- **Full hermetic cooling circuits—charged and adjusted at the factory.**
- **Backed with a warranty that protects *both* the dealer and purchaser.**
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Every home owner is a prospect for air conditioning—including your heating customers. But while the profit figures are BIG . . . so is the competition. That's why it's so important to tie *your* name to the manufacturer who is already "tops" in heating . . . rapidly rising to *number one* position in home cooling, too! Any way you look at it, Lennox has the answers to your air conditioning questions: sizes and styles for *every* home need, easiest installation, 100% hermetically sealed cooling units, and add-on models that save your customers up to half the cost of air conditioning! Get the facts . . . now.

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Air Cooled or Water Cooled . . .
Up-Flo . . . Down-Flo . . . Horizontal-Flo
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Remote Systems, too!

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Yes, I'm interested in the booming air conditioning business, and I'd like to know how Lennox can help me profit more.

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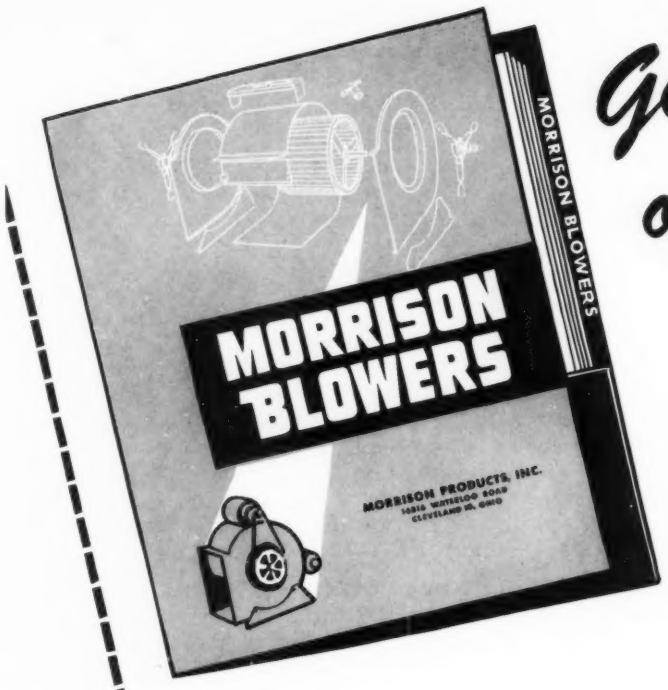

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To aid in proper blower selection, performance curves, as well as performance tables are featured.

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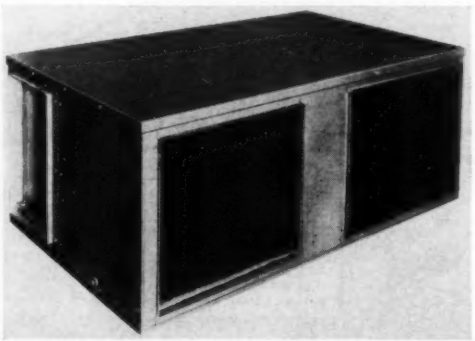
EQUIPMENT DEVELOPMENTS

The latest information on manufacturers' developments is presented here with brief summaries of the applications of these products. For additional product information which is available, see this month's New Literature department.

Horizontal Air Conditioners

"CLIMA-TWIN-ZONE" air conditioning unit designed for simple installation — Peerless Furnace & Foundry Co., 1853 Ludlow Ave., Indianapolis 7. Air cooled unit has hermetically-sealed refrigeration system. Built-in damper permits selective control over two primary zones of the house; on most warm and humid



days the zone selector may be set at dual zone position to cool the entire house. Controls include a three-position damper control, automatic wall-mounted cooling thermostat and a blower selector switch. Two belt-driven centrifugal blowers are used, one for delivery of conditioned air, the other for the air cooled condensing unit.

Acetylene Torch Outfit

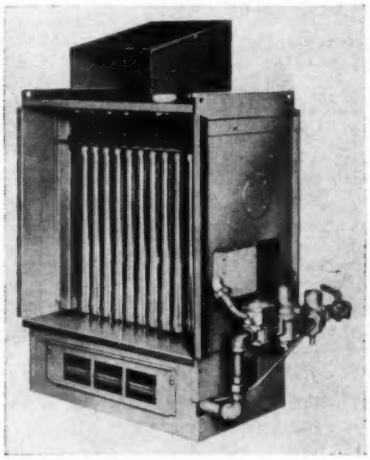
MULTI-PURPOSE acetylene torch outfit for use in sheet metal and other allied work — Ransome Co., 4030 Hollis St., Emeryville 8, Calif. Heads run cool enough to be handled immediately after an operation. Designed to cope with increased silver soldering applications, the torch also provides a pencil flame for electrical work and copper heads suitable for sheet metal jobs. Outfit includes two handle assemblies and seven different head styles, precision regulator of solid brass and quality hose and fittings.

All Purpose Welder

"IDEALARC" combination arc welder said to provide a welding arc for every type of manual welding application, permitting selection of alternating or direct current — Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17. For a-c welding the machine provides a single phase transformer type welder for arc stability; voltage and amperage are controlled to give the desired control of arc characteristics, the company reports. Continuous current control is sought through a rotating core in a separate control circuit designed for control of open circuit voltage. Machine also has an arc booster switch for selecting normal or hot starting; d-c welding current is provided through heavy duty rectifiers.

Gas Fired Duct Furnace

GAS FIRED FURNACE designed for installation directly in the ductwork — Modine Mfg. Co., 1580 DeKoven Ave., Racine, Wis. Air is circulated through the unit by a remotely located blower; air flow can be reversed. Stainless steel construction of heat exchanger and burner permits installation upstream or downstream from air washers and cooling coils in an air

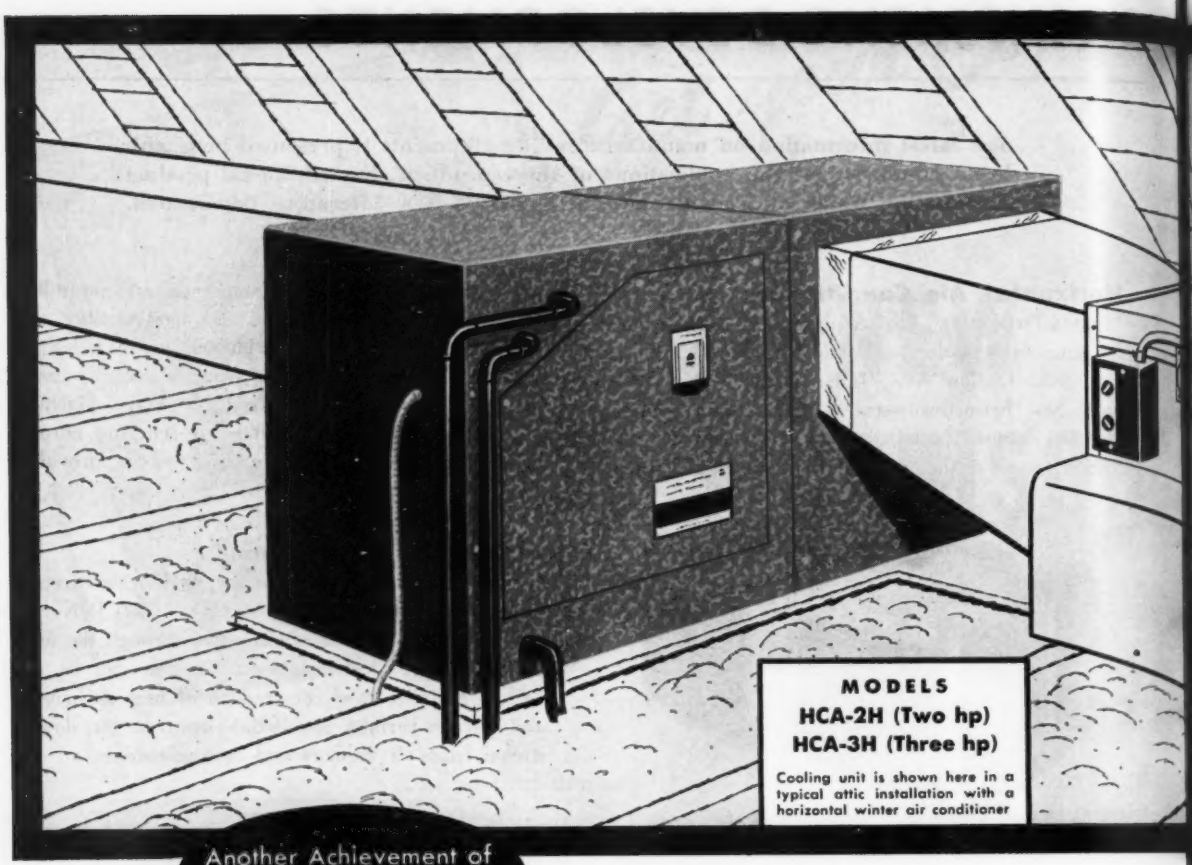


conditioning system. Heat exchanger tubes are die-formed and seam welded into gas-tight structures. Automatic gas shut-off prevents gas from escaping if the pilot light fails; when unit is not operating or in case of power failure, automatic controls prevent gas from entering the burner. High limit control shuts off gas to prevent overheating if the fan stops or air delivery is impeded. Control resets itself automatically.

Area and Crackage Calculator

DIRECT READING calculator which can be used to obtain areas of floors, ceilings, walls, etc., — Paul S. Morton Engineering Service, 609 Bangor Rd., Lawrence, Mich.

(*Continued on page 60*)



Another Achievement of
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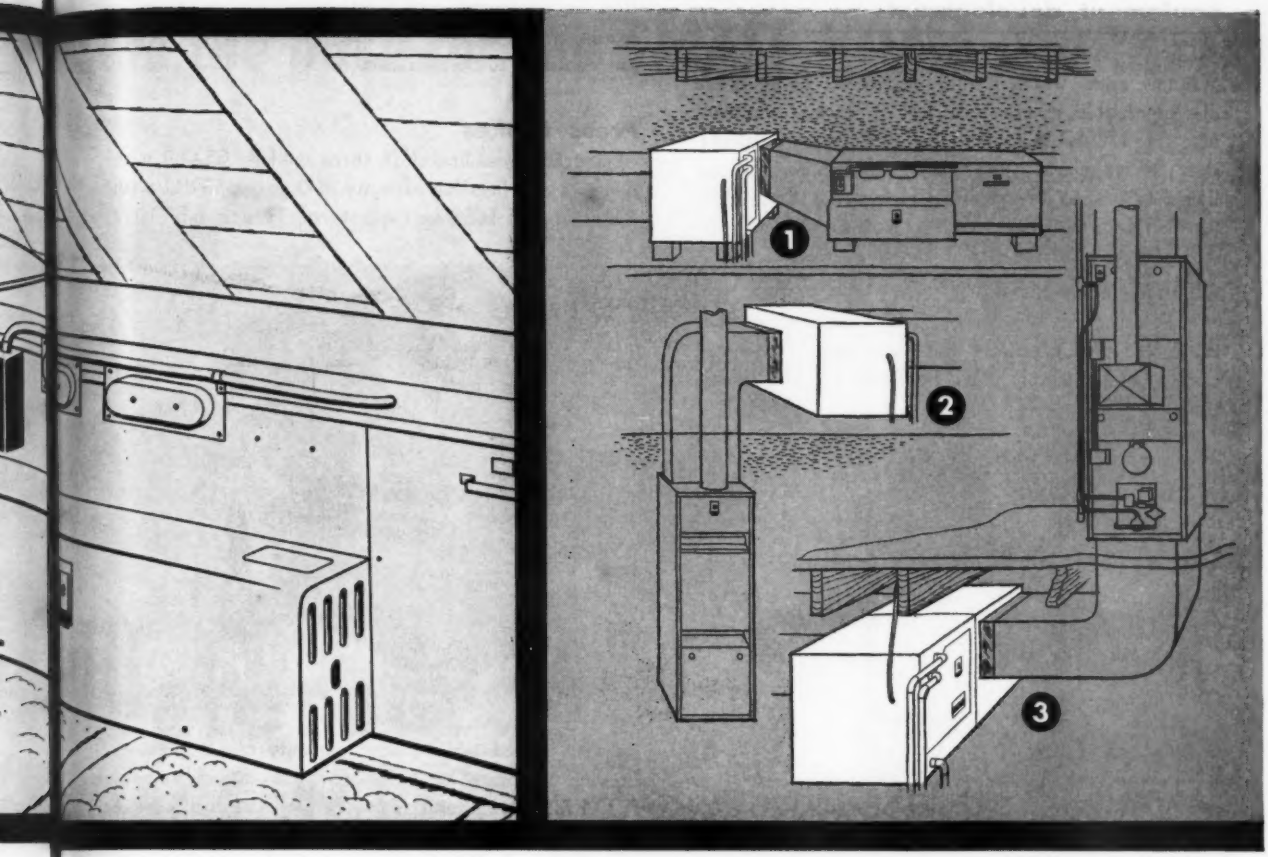
THE ALL-NEW SUNBEAM

SPACE-SAVING HORIZONTAL SUMMER AIR CONDITIONING UNIT

- Completely factory assembled and wired unit, shipped in one package, includes refrigerant circuit with water regulating valve, high-low pressure cut-out with manual re-set button, and magnetic compressor starter with 24-volt holding coil, and transformer.
- Compact design; 43⅞ by 23 by 23 inches.
- Low voltage room thermostat available.
- Jacket is of heavy gauge steel finished in Forge Red.
- Complies with Equipment Standard of Air Conditioning and Refrigeration Institute.
- Five-year warranty on refrigerant circuit.



Here is another outstanding new addition to Sunbeam's complete line of summer and winter air conditioners. Model HCA-H, available for immediate shipment, in 2 hp or 3 hp capacity, is a complete cooling package with quality-built, hermetically sealed refrigerant circuit. It is made without blower for economical installation in any new or existing modern forced air heating system . . . permits full-comfort, year 'round air conditioning in a wide range of applications where space or ductwork limitations prevent use of conventional equipment.

New air-cooled remote unit also available! Get the facts on Sunbeam's new air cooled, 2 hp or 3 hp remote condensing unit that requires no water whatsoever. Placed outside the building, it's easily connected to an evaporator coil, which can be fitted in the ductwork of any winter air conditioner.

Profit by featuring Sunbeam's **complete** line—heating . . . cooling . . . air filtering units. For specifications and prices, contact the Sunbeam distributor listed under "Air Conditioning Equipment" or "Furnaces" in your classified telephone directory.

1. **Model HCA-H cooling unit located in crawl space with a horizontal winter air conditioner.**
2. **Model HCA-H installed in attic space in conjunction with a utility type winter air conditioner.**
3. **Model HCA-H located in crawl space and connected to a counterflow winter air conditioner.**

Sunbeam Air Conditioner Division, Elyria, Ohio.

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American Radiator & Standard Sanitary Corporation

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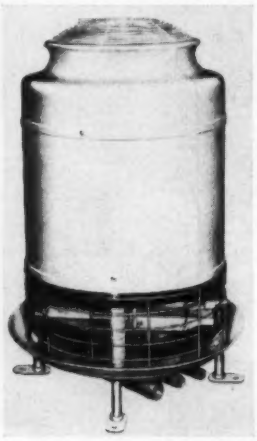
equipment developments *(Continued)*

Window areas which should be treated as glass are also obtainable, as are lineal feet of crack. Instrument uses the NWAHACA method (crackage) of calculation. Device operates like a slide rule, yet reads direct like a table; no interpolating is required. It is "lifetime" plastic and measures 3¾ × 9 in.

Cooling Tower

"QT WATER SAVER" cooling tower with glass fiber reinforced plastic cabinet and sump pan — Kennard Corp., 1819 S. Hanley Rd., St. Louis 17, Mo. Fan is



driven by an efficient low pumping head water turbine eliminating need for outdoor electrical connections. Wetted deck is redwood, other parts are also corrosion resistant. Natural green color blends with shrubbery; vertical air discharge does not disturb shrubs or passersby and low silhouette makes it easy to hide or to complement modern architecture. Unit is in 3 and 5 ton sizes.

Generator for Blower Machine

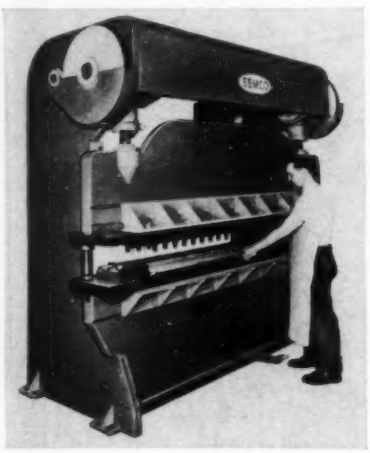
GENERATOR with an output of 1000 or more watts as optional equipment for the "Uni-Matic" insulation blowing machine — Universal Insulating Co., Dept. 11, 333 S. Walnut St., Van Wert, O. Installed as an integral part of the blowing machine, the generator eliminates the need for a connection to the power line of the building. Sufficient electricity is supplied for operation of small tools, truck and work lights operating on alternating or direct current.

Glass Lined Water Heaters

"DIAMONDGLAS" glass lined water heater line featuring external flue to permit an uninterrupted thick glass coating over the tank interior — Mission Appliance Corp., 12611 S. Crenshaw Blvd., Hawthorne, Calif. Compact dimensions are designed for installation in basements and tight fitting closets. Line is available in 40, 30, and 20 gal sizes with a 50 gal size soon to be available.

Press Brakes

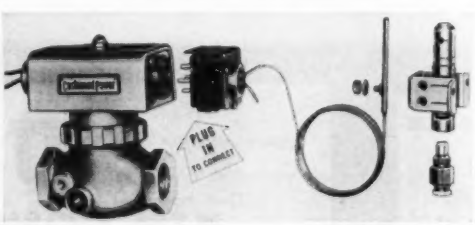
SERIES 55 press brakes in three models: 55-609 with 6 ft bed and bending capacity of 9 gage; 55-811 with 8 ft bed and bending capacity of 11 gage; 55-1012



with 10 ft bed and bending capacity of 12 gage — Service Machine Co., Inc., 716 Miller St., Elizabeth, N.J. Frame, ram and lower bed are of heavy steel welded construction. Ball type screws with buttress threads are of alloy steel forgings, as are the eccentric shafts. Anti-friction and bronze bearings are used throughout. Brake and clutch are of disc type; brake has adjustable lining and may be replaced without dismantling the unit. Double geared and twin driven units have longer gibs to prevent tilting of the ram when short dies are used. Standard equipment includes 5 hp motor, high torque motorized ram adjustment, 3 in. stroke, 5 in. ram adjustment, 9½ in throat depth and 14 in. shut height.

Pilot-Gas Valve Combination

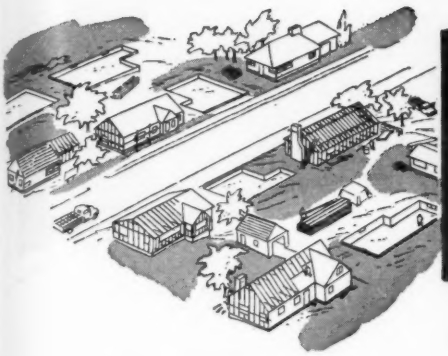
"CUSHIONED-POWER" solenoid gas valves with plug-in type automatic gas pilot — White-Rodgers Electric



Co., 1209 Cass Ave., St. Louis 6. In addition to the plug-in feature the new pilots combine snap action switch and mercury actuated thermal element designed to operate through a wide range of gas pres-

(Continued on page 163)

Sets the pace for the SMALL HOME MARKET!



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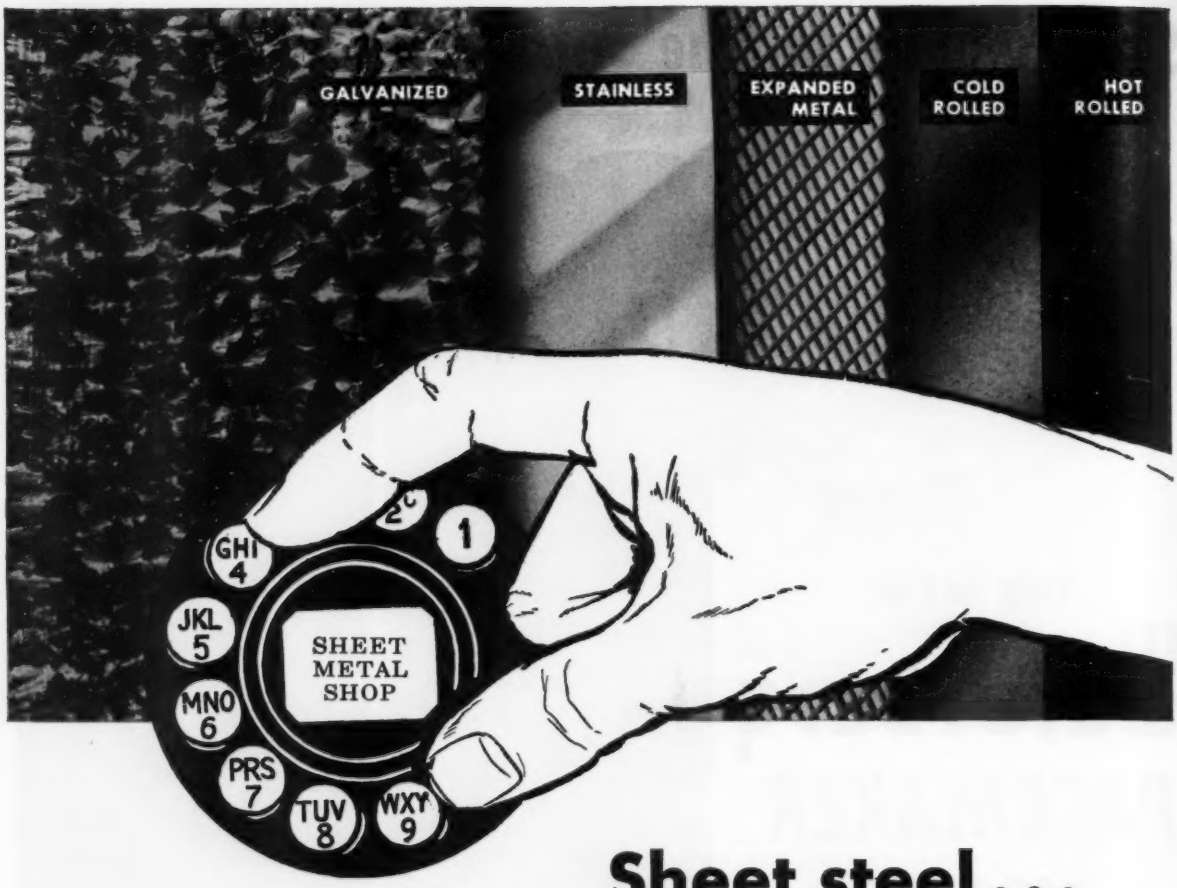

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editorial

One Way To Promote Dealer Goodwill

RECENTLY WE ATTENDED a meeting of the National Heating Wholesalers Association in Philadelphia and heard H. D. Bissell, Director of Merchandising, Minneapolis-Honeywell Regulator Co., tell the association members that the future growth of residential air conditioning can depend largely on heating dealers and their employees.

Mr. Bissell said much of the responsibility of providing the type of training needed rests with the heating wholesaler, and that the wholesaler will be rewarded for his efforts by increased sales in residential air conditioning equipment, both for heating and cooling, and in dealer goodwill, that intangible element that makes for a better dealer relationship.

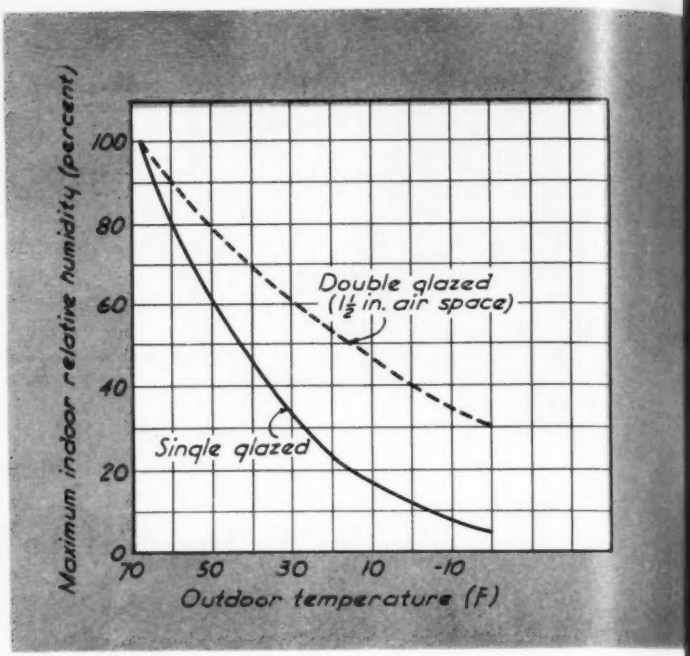
This brings to mind the comments made to us the other day by a Chicago dealer's salesman who had just completed a five-day training program conducted by a wholesaler. This salesman told us that many of the problems he had been laboriously attempting to solve on his own were now much easier and his feeling of a possible error in his work no longer existed.

This residential air conditioning salesman also commented on the other benefits of the wholesaler's training program. He said many of the sales possibilities of accessory equipment previously had passed him by because he had not recognized the importance of many of the pieces of equipment he had been commissioned to sell.

Our friend was proud of the certificate of completion he had received upon finishing the prescribed course. He said he intends to use it along with the other sales tools he carries in his briefcase. His feeling was that any prospect seeing the certificate would immediately have a more receptive attitude toward the recommendations he submitted.

If the enthusiasm shown by this dealer's salesman is any indication of the acceptance of training courses offered by the wholesaler — and we feel it is — then dealer goodwill is a result of wholesaler-sponsored training programs, and its good effects should be felt throughout our industry.

By S. Konzo and H. T. Gilkey
University of Illinois



1 — LIMITING INDOOR relative humidity above which condensation or frost appears on window glass

What Indoor Humidity for Winter Months?

Last month we presented . . .

. . . an arbitrary scale for evaluating house construction, based on design heat loss per sq ft of floor area. The authors submitted that the art of heating would become more of a science if we could measure the essentials of a comfort-producing environment. Not only must we measure these items, but we must also have some concept of what is the most desirable value if we are to make continuous progress. Naturally, since this presentation deals with controversial matters, complete agreement is not expected. This series is aimed at setting up temporary standards, and it is distinctly possible that such standards may have to be revised with time. This discussion, therefore, should be considered as reflecting the opinions only of the authors.

ONE OF THE MOST controversial topics in heating is the subject of relative humidity. During the past 30 years the following questions have been asked time and time again, but with no definite answer that is acceptable to all parties involved in the controversy:

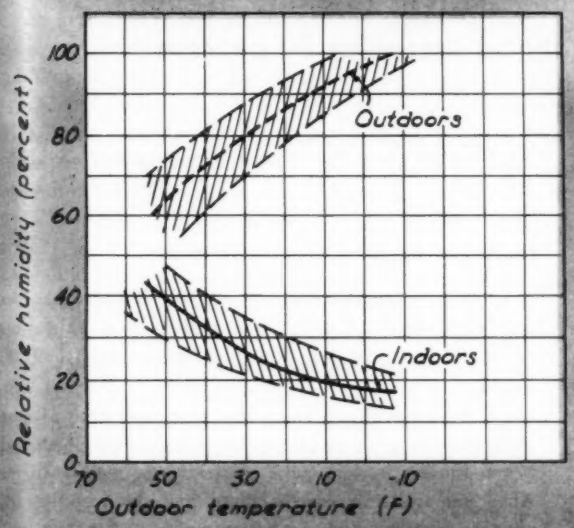
a) Is there a maximum desirable relative humidity during the winter heating season? Is there another value for summer cooling?

b) Is there a minimum desirable relative humidity during the heating and cooling seasons?

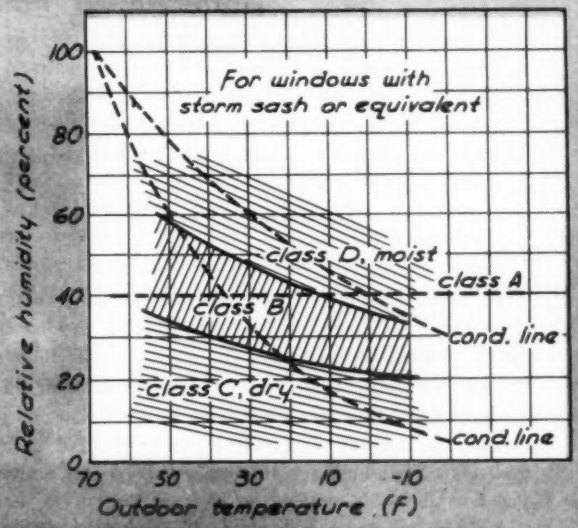
c) Is there an optimum value for each season? If so, is this desirable value based on comfort sensations, on health considerations, or on house limitations?

d) Is it possible that the relative humidity should be allowed to vary during the year and that a constant value is not desired?

e) If we assume that a constant value of relative humidity is desired, how would one attain and control it in a home?



2 — INDOOR RELATIVE HUMIDITIES experienced with three types of evaporator pans



3 — SUGGESTED CLASSIFICATION for relative humidity indoors

• Evidence shows that too high relative humidity causes condensation on windows and physical discomfort from stickiness of the air in the room

• On the other hand, when relative humidity is too low, static electricity is produced, nasal passages dry out and furniture etc. is adversely affected

Let us explain at the outset that we do not have answers to the above questions, nor does anybody else. Unfortunately the subject of relative humidity has been made more confusing by the claims of two divergent groups, as follows:

a) On the one hand we find a number of well intentioned medical practitioners who are strong advocates of relative humidity as high as 70 percent, but whose statements suggest that they are not aware of the implications of such recommendations.

b) Taking the opposing view is one segment of the heating industry which considers that relative humidity is unimportant. It is difficult to decide whether these views are based on solid evidence or upon commercial expediency. At any rate this faction prefers that the subject of relative humidity be ignored.

When two such diametrically opposite views are expressed, chances are good that the answer lies somewhere between the two. If one looks to the *Guide* of the American Society of Heating and Air-Conditioning Engineers, one encounters further confusion. In the early days of the *Effective Temperature Chart*, which was determined from experiments by Dr. F. C. Houghten, no limits were set for relative humidities. Later, and for a number of years, the *Comfort Chart* was shown in the *Guide* with some boundary lines drawn in. For example, the upper limit of the comfort zone for both summer and winter was shown as 70 percent relative humidity and the lower limit was shown as 30 percent. For reasons which are not clear, the recent issues of the *Guide* have gone back to the *Effective Temperature Chart* of the early years, and the boundaries for relative humidity have been removed. The only conclusion at which one can arrive, based on the present printed evidence, is that no single value has been accepted as an optimum. It appears that a more profitable approach is from the

". . . some lower limit of relative humidity is desirable, and should probably be less than 30 percent"

rear — perhaps we can decide what relative humidities we do not want.

Limiting Values of Relative Humidity

The two curves shown in Fig. 1 appeared in bulletin 230 of the University of Illinois Engineering Experiment Station, published in 1931, and are still applicable to current practice. These curves show the maximum relative humidity that is possible before condensation can be expected on window surfaces. The lower curve is for single-glazed windows and the upper curve is for double-glazed windows. It may be noted from the curves that:

a) By using storm sash or double-glazed windows it is possible to maintain about 20 percent higher relative humidity in the house than by the use of single windows.

b) The permissible relative humidity in the house, from the standpoint of window condensation, decreases as the weather gets colder. For example, for an outdoor temperature of 50 F the maximum humidity for a single-sash window is 60 percent, whereas for an outdoor temperature of 10 F, the maximum humidity is less than 20 percent.

The values shown in Fig. 1 are the maximum relative humidities, based entirely upon the tendency for window condensation to occur. At one period in recent time a maximum value of 70 percent was given, beyond which discomfort was considered to occur because of excessive perspiration and stickiness. However, no positive proof existed as to whether the line should have been drawn at 80 percent, 70 percent, 60 percent, or some other value. Hence, the upper limit of humidity was withdrawn until later research could establish a value. At the same time, one will encounter statements in medical writings, especially for the consumer press, that relative humidities of the order of 70 percent are desirable in homes and offices. This might be possible for outdoor temperatures higher than 60 F, but would be disastrous for low outdoor temperatures, as long as our windows and houses are of conventional construction.

When we search for a lower limit of relative humidity we encounter additional blind alleys. As stated previously, the ASHAE *Comfort Chart* at one time showed a lower value of 30 percent. As can be seen by reference to Fig. 1, this value would result in window condensation on single-glazed windows for outdoor temperatures lower than about 30 F. In other words, if the lower limit is to be considered as 30 percent, no building with single-glazed windows could meet the specifications. In fact, practically none of the commercial buildings, schools, churches, and offices could stand relative humidities of 30 percent when the outdoor temperature was below freezing.

Evidence Suggests Need for Control

In spite of the fact that the 30 percent value has been omitted from the *Comfort Chart*, there does exist much evidence that some low limit should be established. For example:

a) Strong evidence exists that the generation of static electricity depends on the relative humidity of the air. When the air is dry, static electricity is readily formed when one walks across the floor, and the resulting discharges can be extremely annoying.

b) Some evidence exists that the drying of the nasal passages is related to the relative humidity of the air we breathe. In fact, pediatricians commonly recommend that rooms be filled with *steam* for the treatment of some respiratory ailments in children.

c) Evidence exists that when survival is at stake for premature infants, body loss is minimized with higher relative humidities.

d) Convincing proof exists that wood shrinkage is related to relative humidity of the air, and that furniture is adversely affected by the drying action of the room air in the winter. Proof also exists that fabrics, leather, and organic materials are also affected by low humidity. A paper has been published showing the effect of humidity on the tone characteristics of a piano.

e) Recent evidence of a surprising nature is that airborne bacteria and other organisms have the shortest life when the relative humidity is 50 percent.

Taking all these items into consideration, one is led to the conclusion that some lower limit of relative humidity is desirable, and that this lower limit should probably be less than the 30 percent value formerly specified. We have arbitrarily considered the lower limit to be 20 percent, realizing that with single-glazed windows condensation would result whenever the outdoor temperature was less than about 15 F. On the other hand, it seems reasonable to assume that any house that is exposed to outdoor temperatures lower than 15 F should be provided with storm sash or equivalent window protection.

Relative Humidities as Actually Experienced

The curves in Fig. 1 merely show the calculated values of the relative humidities which can cause condensation on glass surfaces. On the other hand, the lower curve in Fig. 2 shows the actual relative humidities experienced in Research Residence No. 1 over a wide

range of weather conditions. The curves in Fig. 2 show some interesting trends, as follows:

a) The outdoor relative humidity increases as the weather gets colder, and approaches 100 percent at zero weather. It should be realized that although the relative humidity becomes higher the actual moisture content of the outdoor air becomes less, since colder air cannot hold as much moisture as warm air. In other words, as soon as outdoor air is heated to room temperature, the relative humidity becomes less than ten percent.

b) The indoor relative humidity is not a constant, and decreases as the weather becomes colder. In fact, it is not possible to maintain a constant relative humidity for a wide range of outdoor temperatures unless means are available for varying the amount of water evaporation in accordance with the weather. If, for example, it was considered desirable to maintain a constant value of say 40 percent relative humidity at all times, then not only must a variable evaporation of water be provided, but in mild weather it may be necessary to dehumidify the air.

c) By superimposing the curves in Fig. 2 on top of Fig. 1, it will be observed that for outdoor temperatures lower than about 30 F the actual relative humidities experienced in Research Residence No. 1 were sufficiently high to cause some amount of window condensation with single-glazed windows.

d) A considerable time lag exists in relative humidity readings taken in a house, which accounts for the wide spread of points used to define the curves. In the early fall when outdoor temperatures are near 70 F, the outdoor relative humidities are around 60 percent and open windows permit the interior of the house to become fairly well saturated with moisture. At the first influx of cold weather, the outdoor temperature drops sharply, but the interior of the house is still saturated. During the first week of the season's cool spell, therefore, window condensation is more likely to occur than it is later in the season. Hence, relative humidity readings taken during the early part of the heating season are likely to be higher than normal. Conversely, relative humidity readings taken after a prolonged and severe cold spell will be much lower than normal even after the weather has moderated.

Evaluating Relative Humidity

What it all adds up to is that there is no single value of relative humidity we can expect to maintain indoors with current equipment and construction and over a wide range of outdoor temperatures. Also, we can expect to obtain higher indoor relative humidities during mild weather than when the outdoor temperature is low. There is little use trying to obtain reasonable relative humidities (above 20 percent) in a cold climate unless windows are protected by storm sash or an equivalent.

Hence, if we measure the indoor relative humidity on a given day with accurately indicating instruments, it would be most difficult to state whether the reading is too high, too low or about right, until we also take into account the outdoor temperature and the construction of the windows. In spite of the difficulties, we propose an arbitrary classification, as shown in Fig. 3.

Class A — If a given relative humidity is satisfactory in the fall it should be equally satisfactory in the spring, if we ignore the effects of condensation etc. We propose a value of 40 percent as a target value to shoot at, although we will not defend it against some other value slightly higher or lower. From a practical standpoint, there is no house in the country that can meet a class A requirement of constant relative humidity.

Class B — The shaded region shows a relative humidity zone which should not result in relative humidities less than 20 percent in cold weather, nor in window condensation with double-glazed windows.

Class C — The observed relative humidity is low and will probably be less than 20 percent in severe weather.

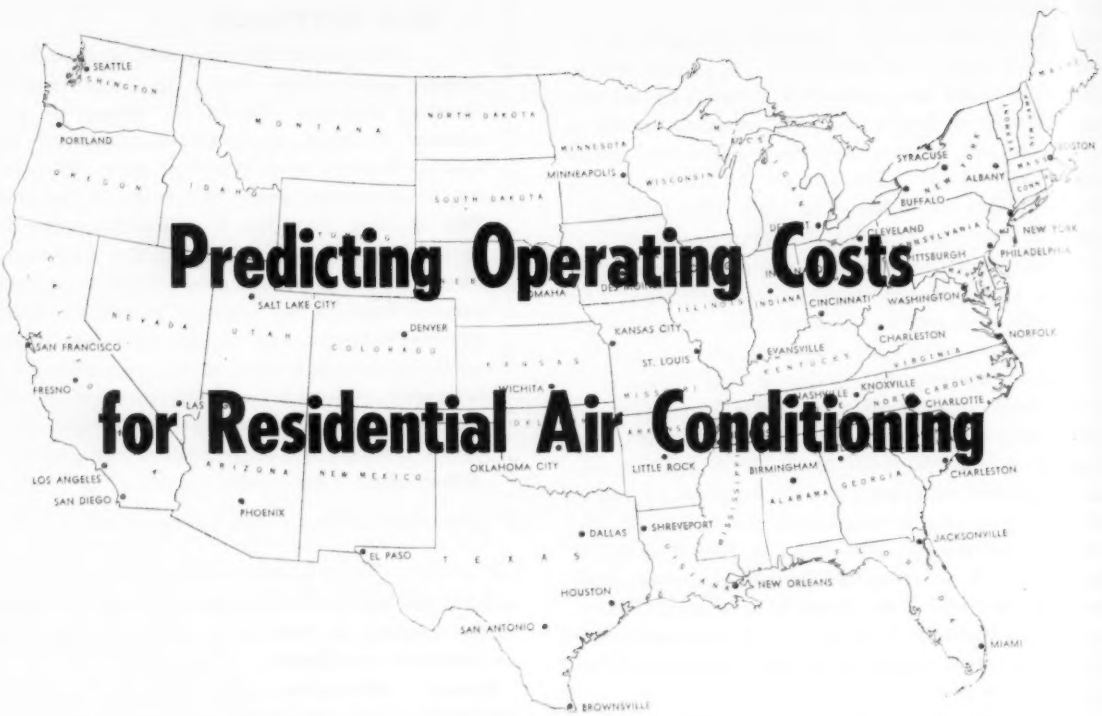
Class D — The observed relative humidity is high and is liable to cause condensation in severe weather.

The arbitrary groups shown in Fig. 3 are modifications of the trends shown in Fig. 2, which were observed in an actual residence. Strictly speaking, the values shown in Fig. 3 apply only to windows with double glazing, and to climates which are relatively severe (namely for design outdoor temperatures of zero F and lower). For mild climate regions, especially those in which outdoor temperatures seldom drop below freezing and where storm sash is seldom used, considerable modifications would be required. In such regions the danger of condensation is lessened and higher relative humidities can be tolerated at all times. For houses located in cold climates and provided with single-glazed windows, even the conditions shown in Class C may not be tolerated. In fact such a house is automatically excluded from any classification higher than Class C.

The next article will continue the discussion of heating standards.

A NEW APPROACH

. . . to modern heating and cooling techniques upon which future improvements in heating systems should be based is presented through complete analysis of the known factors and practices now observed by progressive warm air heating dealers. The authors propose to show how the information now on hand can be developed to provide equipment and installation techniques superior to present practices. Some of the subjects yet to be covered in this series are continuous blower operation, adjustment of fuel input and combustion efficiency, venting of flue gases, noise, temperature control and distribution, temperature differentials and drafts.



Predicting Operating Costs for Residential Air Conditioning

A new and concrete approach combining recent weather data, power and water consumption rates and existing information, and based on known operating characteristics is presented as a tool for building sales

By Robert F. Crossman and I. Burton Faigen

Unitary Equipment Division
Carrier Corporation

OPERATING COSTS for residential air conditioning systems have long been the subject of much discussion, many unfounded conjectures and mistaken opinions. The inability to predict operating costs with accuracy or confidence has been a serious obstacle to greater sales. If the home buyer himself were not apprehensive of this unknown, the mortgage lender or insurer who made his purchase possible probably was.

A number of studies have been made in the last few years, but they were not of a general nature. They cited operating cost experience on a few houses but failed to evolve a method for accurate prediction of operating costs for other houses.

Recently, however, a long step forward to improve this situation has been reported. A study entitled *Investigation of the Operating Cost of Residential Cooling Equipment*, by S. F. Gilman, L. A. Hall, and E. P. Palmatier, was first published in the Journal Section of the April, 1954 *Heating, Piping & Air Conditioning*, and two months later was presented at the semi-annual meeting of the American Society of Heating and Air-Conditioning Engineers at Swampscott, Mass. This paper develops and confirms a method for predicting the seasonal operating cost of residential cooling equipment to an accuracy of $\pm$ 8 percent or $10.00, whichever is greater, for a normal season. It also shows that operating cost can be related to degree days above 70 F. It is now apparent that weather data not now in existence, as well as simplification of pre-

vious methods are called for.

The following data will enable use of the Gilman-Hall-Palmatier study for predicting operating cost.

Basis for Cost Calculations

The basic relations for calculating power and water consumption of residential cooling equipment are:

$$K = T \times P \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [1]$$

and

$$W = 0.06\, T \times Q \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots [2]$$

in which K = seasonal power consumption (kwh); T = predicted operating time (hr); P = power input to equipment (kw); W = seasonal water consumption (thousands of gallons); Q = water consumption rate of equipment (gpm).

Power input (P) and water consumption rate (Q) are known quantities for any make and model of cooling equipment. The predicted operating time (T), however, has been the important unknown factor.

The Gilman-Hall-Palmatier study shows that:

$$T = 24 \times (H/C) \times [D/(t_m - 70)] \quad \ldots\ldots [3]$$

in which H = average hourly cooling load over the 24 hr period (Btuh); D = number of cooling degree days above 70 F; C = total cooling capacity of equipment (Btuh); t_m = average outdoor dry bulb temperature on a design day.

Substituting Equation 3 in equations 1 and 2, we obtain:

$$K = 24 \times H \times (P/C) \times [D/(t_m - 70)] \quad \ldots [4]$$

and

$$W = 1.44 \times H \times (Q/C) \times [D/(t_m - 70)] \quad \ldots [5]$$

in which K = seasonal power consumption (kwh); W = seasonal water consumption, (thousands of gallons); H = average hourly cooling load over the 24 hr period (Btuh); P = power input to equipment (kw); Q = water consumption rate of equipment (gpm); C = total cooling capacity of equipment (Btuh); D = number of cooling degree-days above 70 F; t_m = average outdoor DB temperature on a design day.

It is important to note that the value of H in equations 4 and 5 is not the maximum instantaneous heat gain, but is the average hourly heat gain over a 24 hr period comprising the design day. For cooling load estimating methods presently based on 24 hours, H is the calculated cooling load.

Values for power input (P), water rate (Q), and capacity (C) may be obtained directly from the manufacturer's published ratings for any particular equipment. (The ratios $[P/C]$ and $[Q/C]$ will be discussed at further length later in this article.)

It is felt the data presented in Table A will prove valuable to the air conditioning industry. Since the cooling degree-day data covers only five years experience at 50 weather stations, it is hoped the United States Weather Bureau will recognize the need for degree-day data for all stations.

Calculation of the operating costs for particular installations by means of these formulas and data may be greatly simplified by an analysis of the operating characteristics of residential air conditioning equipment.

Calculating Power and Water Consumption

Our purpose now is to compile tables of seasonal power and water consumption per ton of estimated cooling load. Then, substituting 12,000 Btuh for H in formulas 4 and 5, we have:

$$K_t = 288{,}000\ (P/C)\ [D/(t_m - 70)] \quad \ldots\ldots [6]$$

and

$$W_t = 17{,}280\ (Q/C)\ [D/(t_m - 70)] \quad \ldots\ldots [7]$$

in which K_t = seasonal power consumption per ton of estimated cooling load (kwh); W_t = seasonal water consumption per ton of estimated cooling load (thousands of gallons).

Simplification of Expressions Used

A separate examination of each of the bracketed expressions in equations 6 and 7 leads to further simplification.

Referring to Table A, it is evident that the expression $[D/(t_m - 70)]$ in each of the above formulas is a constant for a given city.

The characteristics of several residential cooling units were studied to evaluate the expression (P/C) for a variety of conditions. Fig. 1 shows that total power (P), and capacity (C), increase with the air quantity (cfm) of the air conditioning unit, and at similar rates. Fig. 2, then, shows that (P/C) is, for all practical purposes, independent of cfm, and dependent only upon condensing temperature. The small error introduced by this assumption is considered to be acceptable, in view of the simplification that results.

Figs. 1 and 2 pertain to waste water condensing systems only. When air cooled or cooling tower systems were studied, additional power for condenser fans and cooling tower pumps, respectively, were included. Since power consumption for either of these is a constant, the (P/C) ratio was increased, but remained substantially independent of cfm, as in waste water systems.

Average (P/C) Values — Table B

Table B shows the average (P/C) values for one of the units studied. These values will vary for different units, and can be calculated by the method described.

Referring to equation 6, if (P/C) can be related through the condensing temperature to weather data, then a single value for K_t (seasonal power consumption per estimated ton of load) can be arrived at for each city. For air cooled systems, this relation is simplified by assuming the condensing temperature will be 30 deg above the average DB temperature of the air

(Text continued on page 75. Tables A, B, C, D and Figs. 1 and 2 are on the following six pages.)

TABLE A — Weather Data and Cooling Degree-Days for Fifty Cities

State City	(1) Design Dry Bulb Temp.(F)	(2) Design Daily Range of Dry Bulb Temp.(F)	(3) Design Average Dry Bulb Temp.(F)	(4) Seasonal Average Dry Bulb Temp.(F)	(5) Seasonal Average Wet Bulb Temp.(F)	(6) Cooling Degree Days (D)												
						Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ALABAMA—Birmingham	95	19	85.5	82.5	69.5	0	0	0	4	95	261	304	258	97	16	0	0	1,035
ARIZONA—Phoenix	105	30	90	87.5	64.5	0	0	0	74	233	478	647	597	435	153	0	0	2,617
ARKANSAS—Little Rock	95	16	87	82.5	70.5	0	0	0	8	98	313	336	310	105	21	0	0	1,191
CALIFORNIA—Fresno	105	35	87.5	87.5	62	0	0	0	8	63	130	356	242	158	23	0	0	980
Los Angeles	90	14	83	80	62	0	0	0	0	8	17	58	36	50	29	19	0	217
San Diego	85	10	80	77.5	61.5	0	0	0	0	0	0	12	13	18	10	5	0	58
San Francisco	85	17	76.5	77.5	—	0	0	0	0	0	0	0	0	0	0	0	0	0
COLORADO—Denver	95	25	82.5	82.5	55.5	0	0	0	0	0	53	97	63	12	0	0	0	225
D. C.—Washington	95	18	86	82.5	67.5	0	0	0	0	22	158	278	187	64	7	0	0	716
FLORIDA—Jacksonville	95	17	86.5	82.5	72.5	0	0	14	26	204	330	358	338	242	83	0	0	1,595
Miami	91	12	85	80.5	72.5	47	47	104	130	260	326	364	358	338	224	74	51	2,323
GEORGIA—Atlanta	95	18	86	82.5	68.5	0	0	0	4	83	196	201	229	118	11	0	0	842
ILLINOIS—Chicago	95	19	85.5	82.5	63.5	0	0	0	0	23	137	176	106	25	7	0	0	474
INDIANA—Evansville	95	19	85.5	82.5	68	0	0	0	4	42	218	257	167	39	9	0	0	736
Indianapolis	95	18	86	82.5	65.5	0	0	0	0	21	129	180	104	21	3	0	0	458
IOWA—Des Moines	95	18	86	82.5	65	0	0	0	0	14	109	161	97	21	5	0	0	407
KANSAS—Wichita	100	21	89.5	85	66.5	0	0	0	3	46	248	256	235	97	13	0	0	898
LOUISANA—New Orleans	95	13	88.5	82.5	73	0	0	11	29	180	338	347	353	232	70	0	0	1,560
Shreveport	100	15	92.5	85	72	0	0	0	14	155	327	377	384	182	52	4	0	1,495
MASSACHUSETTS—Boston	92	13	85.5	81	63.5	0	0	0	0	3	61	152	80	20	0	0	0	316
MICHIGAN—Detroit	95	19	85.5	82.5	63	0	0	0	0	9	100	154	83	21	4	0	0	371
MINNESOTA—Minneapolis	95	17	86.5	82.5	62	0	0	0	0	12	78	116	78	12	0	0	0	296
MISSOURI—Kansas City	100	19	90.5	85	66	0	0	0	6	46	250	265	217	72	26	0	0	882
St. Louis	95	20	85	82.5	67	0	0	0	7	55	243	288	193	55	21	0	0	862
NEBRASKA—Omaha	95	20	85	82.5	65.5	0	0	0	0	25	161	206	136	31	4	0	0	563
NEVADA—Las Vegas	115	40	95	92.5	58	0	0	0	35	146	370	611	544	340	67	0	0	2,113
NEW YORK—Albany	93	18	84	81.5	63	0	0	0	0	2	63	113	45	13	0	0	0	236
Buffalo	93	18	84	81.5	62	0	0	0	0	0	56	89	49	17	0	0	0	211
New York	95	14	88	82.5	65	0	0	0	0	3	89	187	121	32	4	0	0	436
Syracuse	93	18	84	81.5	62.5	0	0	0	0	4	74	110	61	19	0	0	0	268
NORTH CAROLINA—Charlotte	95	16	87	82.5	68.5	0	0	0	4	63	215	261	189	67	6	0	0	805
OHIO—Cincinnati	95	22	84	82.5	65.5	0	0	0	0	25	132	194	122	33	6	0	0	512
Cleveland	95	19	85.5	82.5	63.5	0	0	0	0	8	98	147	83	24	5	0	0	365
OKLAHOMA—Oklahoma City	101	21	90.5	85.5	69	0	0	0	4	68	266	298	307	117	20	0	0	1,080
OREGON—Portland	90	19	80.5	80	66	0	0	0	0	0	3	15	20	7	0	0	0	45
PENNSYLVANIA—Philadelphia	95	14	88	82.5	66	0	0	0	0	9	149	178	140	41	4	0	0	521
Pittsburgh	95	14	88	82.5	63	0	0	0	0	10	82	120	83	23	4	0	0	322
SOUTH CAROLINA—Charleston	95	17	86.5	82.5	72	0	0	0	5	103	246	287	258	122	22	0	0	1,043
TENNESSEE—Knoxville	95	17	86.5	82.5	68	0	0	0	2	55	210	251	191	59	7	0	0	775
Memphis	95	18	86	82.5	70.5	0	0	0	7	105	322	364	293	85	22	0	0	1,198
Nashville	95	17	86.5	82.5	69	0	0	0	5	71	254	313	224	65	13	0	0	945
TEXAS—Brownsville	100	20	90	85	73	30	23	72	121	273	377	419	405	322	165	49	24	2,280
Dallas	100	21	89.5	85	70.5	0	0	6	16	152	392	455	481	260	77	10	0	1,849
El Paso	100	23	88.5	85	60.5	0	0	0	17	150	396	374	374	203	36	0	0	1,550
Houston	95	14	88	82.5	73	0	0	16	37	179	317	379	382	246	85	10	0	1,651
San Antonio	100	19	90.5	85	70	0	0	16	33	181	336	408	429	253	83	8	0	1,747
UTAH—Salt Lake City	95	25	82.5	82.5	56.5	0	0	0	0	0	45	197	169	41	0	0	0	452
VIRGINIA—Norfolk	95	16	87	82.5	69.5	0	0	0	3	28	157	265	194	72	6	0	0	725
WASHINGTON—Seattle	85	17	76.5	77.5	56	0	0	0	0	0	1	6	5	1	0	0	0	13
WEST VIRGINIA—Charleston	95	16	87	82.5	66	0	0	0	3	22	123	176	104	30	3	0	0	461

Table A—Weather Data

The following notes and explanations apply to the weather data in Table A (left).

Column 1 — Design Dry Bulb Temperatures are the design DB temperatures in common use as reported in the ASHAE *Guide*, 1954.

Column 2 — Design Daily Range of Dry Bulb Temperatures are from *Summer Weather Data*, The Marley Co., 1944, where available. Others are from Carrier Corp. data.

Column 3 — Design Average Dry Bulb Temperatures are calculated as follows:

$$t_m = t_{des} - t_{dr}/2$$

in which t_m = average outdoor DB temperatures on a design day; t_{des} = design DB temperatures; t_{dr} = design daily temperature range of DB temperatures.

Column 4 — Seasonal Average Dry Bulb Temperatures are used to determine the condensing temperatures at which power consumption for air-cooled equipment must be evaluated. They are calculated as follows:

$$t_{adb} = (t_{des} + 70)/2$$

in which t_{adb} = seasonal average DB temperature; t_{des} = design DB temperature. This relation is based on experience and observations made during the Gilman-Hall-Palmatier study.

Column 5 — Seasonal Average Wet Bulb Temperatures are used to determine the condensing temperatures at which power consumption for cooling tower applications must be evaluated. They are obtained by weighing the monthly average WB temperatures (averaged from the 6-Hourly Weather Bureau Observations for the years 1949 to 1953, inclusive) by the cooling degree-days for the month.

Column 6 — Cooling Degree Days (D) are obtained by averaging the 6-Hourly Weather Bureau Observations for each day, subtracting 70, and summating the results for each month, for the years 1949 to 1953, inclusive. Negative degree days are excluded. Sample calculations indicated considerable error in using monthly or daily mean temperatures; the error introduced, however, in using the 6-hourly readings instead of the hourly readings is insignificant. Cooling degree days calculated from normalized weather data will show considerable error in northern cities. Since normalized data is gathered over a period of years, it includes negative degree-days. Normalized weather data can only be used when all temperatures are 70 or above.

TABLE B—Average (P/C) values

Condensing temperature	$(P/C) \times 10^4$		
	Waste water	Cooling tower	Air cooled
90	.876	1.128	—
95	.912	1.170	—
100	.951	1.216	—
105	1.002	1.277	1.062
110	1.057	1.339	1.118
115	1.120	—	1.183
120	1.187	—	1.252
125	1.257	—	1.325
130	1.337	—	—

TABLE C—(Q/C) and (P/C) values for various entering and leaving water temperatures

Entering water temperature	Leaving water temperature	$(Q/C) \times 10^4$	Condensing temperature	$(P/C) \times 10^4$
65	75	2.5	81.5	.830
	80	1.667	85.9	.852
	85	1.25	90.6	.880
	90	1.0	95.1	.913
	95	.833	99.7	.949
	100	.714	104.2	.992
	105	.625	108.7	1.043
70	80	2.5	86.2	.854
	85	1.667	90.8	.881
	90	1.25	95.4	.915
	95	1.0	100.0	.951
	100	.833	104.5	.994
	105	.714	109.0	1.046
75	85	2.5	91.1	.883
	90	1.667	95.7	.917
	95	1.25	100.3	.954
	100	1.0	104.8	.998
	105	.833	109.3	1.049
80	90	2.5	96.0	.920
	95	1.667	100.6	.957
	100	1.25	105.1	1.001
	105	1.0	109.6	1.053
85	95	2.5	100.9	.960
	100	1.667	105.4	1.006
	105	1.25	109.9	1.056

TABLE D — Seasonal Power and Water Consumption for Fifty Cities

Numbers in Bold Type are Power Consumption — kilowatt-hours per estimated ton of cooling load per season.

Numbers in Light Face are Water Consumption — thousands of gallons per estimated ton of cooling load per season.

	Waste Water Systems																				
	Entering Water Temperature																				
	65							70						75					80		
	Leaving Water Temperature																				
State City	75	80	85	90	95	100	105	80	85	90	95	100	105	85	90	95	100	105	90	95	100	105
ALABAMA—Birmingham	**1596**	**1638**	**1692**	**1756**	**1825**	**1908**	**2006**	**1642**	**1694**	**1760**	**1829**	**1912**	**2012**	**1698**	**1763**	**1835**	**1919**	**2017**	**1769**	**1840**	**1925**	**2025**
	288	192	144	115	96	82	72	288	192	144	115	96	82	288	192	144	115	96	288	192	144	115
ARIZONA—Phoenix	**3128**	**3211**	**3316**	**3441**	**3576**	**3738**	**3931**	**3218**	**3320**	**3448**	**3584**	**3746**	**3942**	**3328**	**3456**	**3595**	**3761**	**3953**	**3467**	**3606**	**3772**	**3968**
	565	377	283	226	188	161	141	565	377	283	226	188	161	565	377	283	226	188	565	377	283	226
ARKANSAS—Little Rock	**1675**	**1719**	**1776**	**1842**	**1915**	**2002**	**2104**	**1723**	**1778**	**1846**	**1919**	**2006**	**2111**	**1782**	**1850**	**1925**	**2014**	**2117**	**1856**	**1931**	**2020**	**2125**
	303	202	151	121	101	86	76	303	202	151	121	101	86	303	202	151	121	101	303	202	151	121
CALIFORNIA—Fresno	**1339**	**1374**	**1419**	**1472**	**1531**	**1600**	**1682**	**1377**	**1421**	**1476**	**1534**	**1603**	**1687**	**1424**	**1479**	**1539**	**1610**	**1692**	**1484**	**1543**	**1614**	**1698**
	242	161	121	97	81	69	60	242	161	121	97	81	69	242	161	121	97	81	242	161	121	97
Los Angeles	**399**	**410**	**423**	**439**	**456**	**477**	**501**	**411**	**424**	**440**	**457**	**478**	**503**	**424**	**441**	**459**	**480**	**504**	**442**	**460**	**481**	**506**
	72	48	36	29	24	21	18	72	48	36	29	24	21	72	48	36	29	24	72	48	36	29
San Diego	**139**	**142**	**147**	**153**	**159**	**166**	**174**	**143**	**147**	**153**	**159**	**166**	**175**	**147**	**153**	**159**	**167**	**175**	**154**	**160**	**167**	**176**
	25	17	13	10	8	7	6	25	17	13	10	8	7	25	17	13	10	8	25	17	13	10
San Francisco	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COLORADO—Denver	**430**	**442**	**456**	**473**	**492**	**514**	**541**	**443**	**457**	**474**	**493**	**515**	**542**	**458**	**475**	**495**	**517**	**544**	**477**	**496**	**519**	**546**
	78	52	39	31	26	22	19	78	52	39	31	26	22	78	52	39	31	26	78	52	39	31
D. C.—Washington	**1070**	**1098**	**1134**	**1177**	**1223**	**1278**	**1344**	**1101**	**1135**	**1179**	**1226**	**1281**	**1348**	**1138**	**1182**	**1230**	**1286**	**1352**	**1186**	**1233**	**1290**	**1357**
	193	129	97	77	64	55	48	193	129	97	77	64	55	193	129	97	77	64	193	129	97	77
FLORIDA—Jacksonville	**2311**	**2372**	**2450**	**2542**	**2642**	**2762**	**2904**	**2378**	**2453**	**2547**	**2648**	**2767**	**2912**	**2458**	**2553**	**2656**	**2778**	**2920**	**2561**	**2664**	**2786**	**2932**
	418	278	209	167	139	119	104	418	278	209	167	139	119	418	278	209	167	139	418	278	209	167
Miami	**3702**	**3800**	**3925**	**4072**	**4233**	**4424**	**4652**	**3809**	**3929**	**4081**	**4242**	**4433**	**4665**	**3938**	**4090**	**4255**	**4451**	**4679**	**4103**	**4268**	**4465**	**4697**
	669	446	335	268	223	191	167	669	446	335	268	223	191	669	446	335	268	223	669	446	335	268
GEORGIA—Atlanta	**1258**	**1291**	**1334**	**1384**	**1438**	**1503**	**1581**	**1294**	**1335**	**1387**	**1441**	**1507**	**1585**	**1338**	**1390**	**1446**	**1513**	**1590**	**1394**	**1450**	**1517**	**1596**
	227	152	114	91	76	65	57	227	152	114	91	76	65	227	152	114	91	76	227	152	114	91
ILLINOIS—Chicago	**731**	**750**	**775**	**804**	**836**	**874**	**919**	**752**	**776**	**806**	**838**	**875**	**921**	**778**	**808**	**840**	**879**	**924**	**810**	**843**	**882**	**927**
	132	88	66	53	44	38	33	132	88	66	53	44	38	132	88	66	53	44	132	88	66	53
INDIANA—Evansville	**1135**	**1165**	**1203**	**1249**	**1298**	**1357**	**1426**	**1168**	**1205**	**1251**	**1301**	**1359**	**1430**	**1208**	**1254**	**1305**	**1365**	**1435**	**1258**	**1309**	**1369**	**1440**
	205	137	103	82	68	59	51	205	137	103	82	68	59	205	137	103	82	68	205	137	103	82
Indianapolis	**684**	**702**	**725**	**753**	**782**	**818**	**860**	**704**	**726**	**754**	**784**	**819**	**862**	**728**	**756**	**786**	**823**	**865**	**758**	**789**	**825**	**868**
	123	82	62	49	41	35	31	123	82	62	49	41	35	123	82	62	49	41	123	82	62	49
IOWA—Des Moines	**608**	**624**	**645**	**669**	**695**	**727**	**764**	**626**	**645**	**670**	**697**	**728**	**766**	**647**	**672**	**699**	**731**	**768**	**674**	**701**	**733**	**774**
	110	73	55	44	37	31	27	110	73	55	44	37	31	110	73	55	44	37	110	73	55	44
KANSAS—Wichita	**1101**	**1130**	**1167**	**1211**	**1259**	**1316**	**1383**	**1133**	**1168**	**1214**	**1261**	**1318**	**1387**	**1171**	**1216**	**1265**	**1324**	**1391**	**1220**	**1269**	**1328**	**1397**
	199	133	99	80	66	57	50	199	133	99	80	66	57	199	133	99	80	66	199	133	99	80
LOUISIANA—New Orleans	**2016**	**2069**	**2137**	**2217**	**2305**	**2409**	**2533**	**2074**	**2140**	**2222**	**2310**	**2414**	**2540**	**2144**	**2227**	**2317**	**2424**	**2548**	**2234**	**2324**	**2431**	**2557**
	364	243	182	146	121	104	91	364	243	182	146	121	104	364	243	182	146	121	364	243	182	146
Shreveport	**1588**	**1630**	**1684**	**1747**	**1816**	**1898**	**1996**	**1634**	**1686**	**1751**	**1820**	**1902**	**2002**	**1690**	**1755**	**1826**	**1910**	**2007**	**1761**	**1831**	**1916**	**2015**
	287	191	144	115	96	82	72	287	191	144	115	96	82	287	191	144	115	96	287	191	144	115
MASSACHUSETTS—Boston	**487**	**500**	**517**	**536**	**557**	**582**	**612**	**501**	**517**	**537**	**558**	**584**	**614**	**518**	**538**	**560**	**586**	**616**	**540**	**562**	**588**	**618**
	88	59	44	35	29	25	22	88	59	44	35	29	25	88	59	44	35	29	88	59	44	35
MICHIGAN—Detroit	**572**	**587**	**607**	**629**	**654**	**684**	**719**	**589**	**607**	**631**	**656**	**685**	**721**	**609**	**632**	**658**	**688**	**723**	**634**	**660**	**690**	**726**
	103	69	52	41	34	30	26	103	69	52	41	34	30	103	69	52	41	34	103	69	52	41
MINNESOTA—Minneapolis	**429**	**440**	**455**	**472**	**490**	**513**	**539**	**441**	**455**	**473**	**491**	**514**	**540**	**456**	**474**	**493**	**516**	**542**	**475**	**494**	**517**	**544**
	77	52	39	31	26	22	19	77	52	39	31	26	22	77	52	39	31	26	77	52	39	31
MISSOURI—Kansas City	**1028**	**1056**	**1090**	**1131**	**1176**	**1229**	**1292**	**1058**	**1092**	**1134**	**1178**	**1232**	**1296**	**1094**	**1136**	**1182**	**1237**	**1300**	**1140**	**1186**	**1240**	**1305**
	186	124	93	74	62	53	46	186	124	93	74	62	53	186	124	93	74	62	186	124	93	74
St. Louis	**1374**	**1410**	**1456**	**1511**	**1571**	**1642**	**1726**	**1413**	**1458**	**1514**	**1574**	**1645**	**1731**	**1461**	**1518**	**1579**	**1652**	**1736**	**1523**	**1584**	**1657**	**1743**
	248	166	124	99	83	71	62	248	166	124	99	83	71	248	166	124	99	83	248	166	124	99
NEBRASKA—Omaha	**897**	**921**	**951**	**987**	**1026**	**1072**	**1127**	**923**	**952**	**989**	**1028**	**1074**	**1131**	**954**	**991**	**1031**	**1079**	**1134**	**994**	**1034**	**1082**	**1138**
	162	108	81	65	54	46	41	162	108	81	65	54	46	162	108	81	65	54	162	108	81	65

85			Cooling Tower Systems	Air Cooled Systems	City
95	100	105			
1846	1935	2031	2329	2213	Birmingham
288	192	144	8.7	—	
3618	3791	3980	4394	4590	Phoenix
565	377	283	17.0	—	
1937	2030	2131	2466	2322	Little Rock
303	202	151	9.1	—	
1548	1622	1703	1847	1964	Fresno
242	161	121	7.3	—	
462	484	508	550	537	Los Angeles
72	48	36	2.2	—	
160	168	176	191	182	San Diego
25	17	13	.75	—	
0	0	0	0	0	San Francisco
0	0	0	0	0	
498	522	447	566	597	Denver
78	52	39	2.3	—	
1237	1297	1361	1538	1483	Washington
193	129	97	5.8	—	
2673	2801	2940	3472	3204	Jacksonville
418	278	209	12.5	—	
4282	4487	4710	5562	5018	Miami
669	446	335	20.1	—	
1455	1525	1600	1822	1744	Atlanta
227	152	114	6.8	—	
845	886	930	1019	1014	Chicago
132	88	66	4.0	—	
1313	1376	1444	1638	1574	Evansville
205	137	103	6.2	—	
791	829	871	969	949	Indianapolis
123	82	62	3.7	—	
703	737	774	857	843	Des Moines
110	73	55	3.3	—	
1273	1334	1401	1570	1569	Wichita
199	133	99	6.0	—	
2331	2443	2565	3043	2795	New Orleans
364	243	182	10.9	—	
1837	1925	2021	2373	2264	Shreveport
287	191	144	8.6	—	
564	591	620	679	664	Boston
88	59	44	2.6	—	
662	693	728	795	793	Detroit
103	69	52	3.1	—	
496	520	546	592	595	Minneapolis
77	52	39	2.3	—	
1190	1247	1308	1461	1466	Kansas City
186	124	93	5.6	—	
1589	1665	1748	1966	1905	St. Louis
248	166	124	7.4	—	
1038	1087	1141	1270	1244	Omaha
162	108	81	4.9	—	

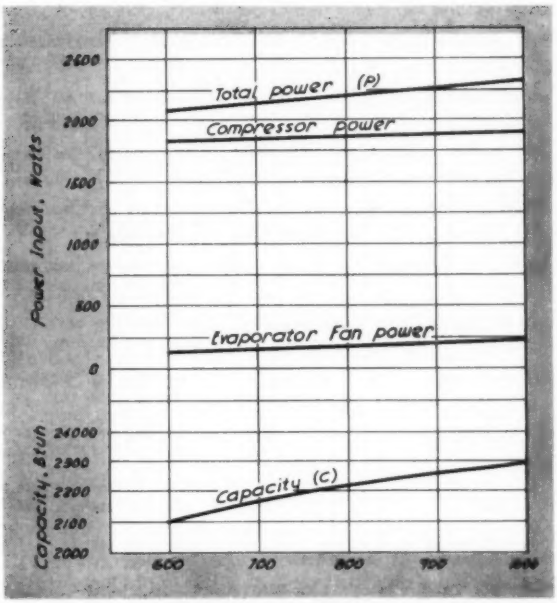


Fig. 1—CAPACITY AND POWER vs. cfm. Note: entering WB temperature and condensing temperature constant

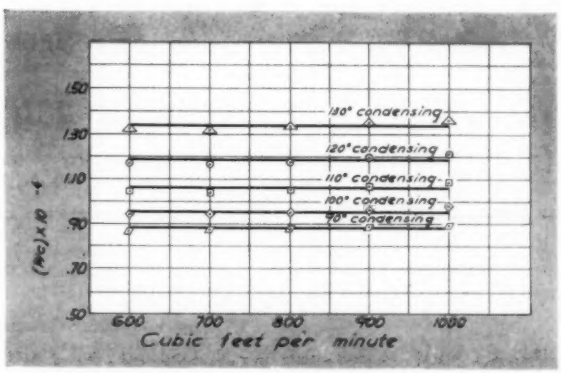


Fig. 2—(P/C) vs. cfm. Note: entering WB temperature constant

TABLE D — Seasonal Power and Water Consumption for Fifty Cities

Numbers in Bold Type are Power Consumption — kilowatt-hours per estimated ton of cooling load per season.
Numbers in Light Face are Water Consumption — thousands of gallons per estimated ton of cooling load per season.

	Waste Water Systems																				
	Entering Water Temperature																				
	65							70						75					80		
	Leaving Water Temperature																				
State City	75	80	85	90	95	100	105	80	85	90	95	100	105	85	90	95	100	105	90	95	100	105
NEVADA—Las Vegas	**2020**	**2074**	**2142**	**2222**	**2310**	**2415**	**2539**	**2079**	**2145**	**2227**	**2315**	**2420**	**2546**	**2149**	**2232**	**2322**	**2429**	**2553**	**2239**	**2330**	**2437**	**2563**
	365	243	183	146	122	104	91	365	243	183	146	122	104	365	243	183	146	122	365	243	183	146
NEW YORK—Albany	**403**	**414**	**427**	**443**	**461**	**482**	**506**	**415**	**428**	**444**	**462**	**483**	**508**	**429**	**445**	**463**	**485**	**509**	**447**	**465**	**486**	**511**
	73	49	36	29	24	21	18	73	49	36	29	24	21	73	49	36	29	24	73	49	36	29
Buffalo	**360**	**370**	**382**	**396**	**412**	**431**	**453**	**371**	**382**	**397**	**413**	**431**	**454**	**383**	**398**	**414**	**433**	**455**	**399**	**415**	**434**	**457**
	65	43	33	26	22	19	16	65	43	33	26	22	19	65	43	33	26	22	65	43	33	26
New York	**579**	**594**	**614**	**637**	**662**	**692**	**728**	**596**	**615**	**638**	**663**	**693**	**730**	**616**	**640**	**666**	**696**	**732**	**642**	**668**	**698**	**735**
	105	70	52	42	35	30	26	105	70	52	42	35	30	105	70	52	42	35	105	70	52	42
Syracuse	**458**	**470**	**485**	**503**	**523**	**547**	**575**	**471**	**486**	**504**	**524**	**548**	**577**	**487**	**506**	**526**	**550**	**578**	**507**	**528**	**552**	**581**
	83	55	41	33	28	24	21	83	55	41	33	28	24	83	55	41	33	28	83	55	41	33
NORTH CAROLINA—Charlotte	**1132**	**1162**	**1200**	**1245**	**1294**	**1353**	**1422**	**1165**	**1201**	**1248**	**1297**	**1356**	**1426**	**1204**	**1251**	**1301**	**1361**	**1431**	**1255**	**1305**	**1365**	**1436**
	205	136	102	82	68	58	51	205	136	102	82	68	58	205	136	102	82	68	205	136	102	82
OHIO—Cincinnati	**874**	**897**	**927**	**962**	**1000**	**1045**	**1099**	**899**	**928**	**964**	**1002**	**1047**	**1102**	**930**	**966**	**1005**	**1051**	**1105**	**969**	**1008**	**1054**	**1109**
	158	105	79	63	53	45	39	158	105	79	63	53	45	158	105	79	63	53	158	105	79	63
Cleveland	**563**	**578**	**597**	**619**	**644**	**673**	**707**	**579**	**597**	**621**	**645**	**674**	**709**	**599**	**622**	**647**	**677**	**711**	**624**	**649**	**679**	**714**
	102	68	51	41	34	29	25	102	68	51	41	34	29	102	68	51	41	34	102	68	51	41
OKLAHOMA—Oklahoma City	**1259**	**1293**	**1335**	**1385**	**1440**	**1505**	**1583**	**1296**	**1337**	**1388**	**1443**	**1508**	**1587**	**1340**	**1391**	**1447**	**1514**	**1592**	**1396**	**1452**	**1519**	**1598**
	228	152	114	91	76	65	57	228	152	114	91	76	65	228	152	114	91	76	228	152	114	91
OREGON—Portland	**102**	**105**	**109**	**113**	**117**	**122**	**129**	**105**	**109**	**113**	**117**	**123**	**129**	**109**	**113**	**118**	**123**	**129**	**114**	**118**	**124**	**130**
	18	12	9	7	6	5	5	18	12	9	7	6	5	18	12	9	7	6	18	12	9	7
PENNSYLVANIA—Philadelphia	**692**	**710**	**734**	**761**	**791**	**827**	**869**	**712**	**734**	**763**	**793**	**829**	**872**	**736**	**764**	**795**	**832**	**874**	**767**	**798**	**834**	**878**
	125	83	63	50	42	36	31	125	83	63	50	42	36	125	83	63	50	42	125	83	63	50
Pittsburgh	**428**	**439**	**453**	**470**	**489**	**511**	**537**	**440**	**454**	**471**	**490**	**512**	**539**	**455**	**472**	**492**	**514**	**540**	**474**	**493**	**516**	**543**
	77	52	39	31	26	22	19	77	52	39	31	26	22	77	52	39	31	26	77	52	39	31
SOUTH CAROLINA—Charleston	**1511**	**1551**	**1602**	**1662**	**1728**	**1806**	**1899**	**1555**	**1604**	**1666**	**1731**	**1810**	**1904**	**1608**	**1669**	**1737**	**1817**	**1910**	**1675**	**1742**	**1822**	**1917**
	273	182	137	109	91	78	68	273	182	137	109	91	78	273	182	137	109	91	273	182	137	109
TENNESSEE—Knoxville	**1123**	**1153**	**1190**	**1235**	**1284**	**1342**	**1411**	**1155**	**1192**	**1238**	**1286**	**1345**	**1415**	**1194**	**1240**	**1291**	**1350**	**1419**	**1245**	**1295**	**1354**	**1424**
	203	135	101	81	68	58	51	203	135	101	81	68	58	203	135	101	81	68	203	135	101	81
Memphis	**1790**	**1837**	**1898**	**1969**	**2046**	**2139**	**2249**	**1842**	**1900**	**1973**	**2051**	**2143**	**2256**	**1904**	**1977**	**2057**	**2152**	**2262**	**1984**	**2064**	**2159**	**2271**
	323	216	162	129	108	92	81	323	216	162	129	108	92	323	216	162	129	108	323	216	162	129
Nashville	**1369**	**1405**	**1452**	**1506**	**1565**	**1636**	**1720**	**1409**	**1453**	**1509**	**1569**	**1640**	**1725**	**1456**	**1513**	**1574**	**1646**	**1730**	**1517**	**1579**	**1651**	**1737**
	247	165	124	99	82	71	62	247	165	124	99	82	71	247	165	124	99	82	247	165	124	99
TEXAS—Brownsville	**2725**	**2797**	**2889**	**2998**	**3116**	**3257**	**3424**	**2804**	**2892**	**3004**	**3122**	**3264**	**3434**	**2899**	**3011**	**3132**	**3277**	**3444**	**3021**	**3142**	**3286**	**3457**
	492	328	246	197	164	141	123	492	328	246	197	164	141	492	328	246	197	164	492	328	246	197
Dallas	**2267**	**2327**	**2403**	**2493**	**2592**	**2709**	**2848**	**2332**	**2406**	**2499**	**2597**	**2714**	**2856**	**2411**	**2504**	**2605**	**2725**	**2865**	**2512**	**2613**	**2734**	**2876**
	410	273	205	164	136	117	102	410	273	205	164	136	117	410	273	205	164	136	410	273	205	164
El Paso	**2003**	**2056**	**2123**	**2203**	**2290**	**2394**	**2517**	**2061**	**2126**	**2208**	**2295**	**2398**	**2524**	**2131**	**2213**	**2302**	**2408**	**2531**	**2220**	**2309**	**2415**	**2541**
	362	241	181	145	121	103	90	362	241	181	145	121	103	362	241	181	145	121	362	241	181	145
Houston	**2193**	**2251**	**2325**	**2412**	**2507**	**2620**	**2755**	**2256**	**2327**	**2417**	**2512**	**2626**	**2763**	**2333**	**2422**	**2520**	**2636**	**2771**	**2430**	**2528**	**2644**	**2782**
	396	264	198	158	132	113	99	396	264	198	158	132	113	396	264	198	158	132	396	264	198	158
San Antonio	**2037**	**2091**	**2160**	**2241**	**2329**	**2435**	**2560**	**2096**	**2162**	**2246**	**2334**	**2440**	**2567**	**2167**	**2251**	**2341**	**2449**	**2575**	**2258**	**2349**	**2457**	**2584**
	368	245	184	147	123	105	92	368	245	184	147	123	105	368	245	184	147	123	368	245	184	147
UTAH—Salt Lake City	**864**	**887**	**916**	**951**	**988**	**1033**	**1086**	**889**	**917**	**953**	**990**	**1035**	**1089**	**920**	**955**	**994**	**1039**	**1092**	**958**	**997**	**1042**	**1097**
	156	104	78	62	52	45	39	156	104	78	62	52	45	156	104	78	62	52	156	104	78	62
VIRGINIA—Norfolk	**1019**	**1046**	**1081**	**1121**	**1166**	**1218**	**1281**	**1049**	**1082**	**1124**	**1168**	**1221**	**1285**	**1085**	**1126**	**1172**	**1226**	**1288**	**1130**	**1175**	**1229**	**1293**
	184	123	92	74	61	53	46	184	123	92	74	61	53	184	123	92	74	61	184	123	92	74
WASHINGTON—Seattle	**48**	**49**	**51**	**53**	**55**	**57**	**60**	**49**	**51**	**53**	**55**	**57**	**60**	**51**	**53**	**55**	**57**	**60**	**53**	**55**	**58**	**61**
	8	6	4	3	3	2	2	8	6	4	3	3	2	8	6	4	3	3	8	6	4	3
WEST VIRGINIA—Charleston	**648**	**665**	**687**	**713**	**741**	**775**	**815**	**667**	**688**	**715**	**743**	**776**	**817**	**690**	**716**	**745**	**779**	**819**	**719**	**747**	**782**	**822**
	117	78	59	47	39	33	29	117	78	59	47	39	33	117	78	59	47	39	117	78	59	47

85			Cooling Tower Systems	Air Cooled Systems	City
95	100	105			
2337	2449	2570	2707	3138	Las Vegas
365	243	183	11.0	—	
466	488	513	560	552	Albany
73	49	36	2.2	—	
417	437	458	497	494	Buffalo
65	43	33	2.0	—	
670	702	737	816	803	New York
105	70	52	3.1	—	
529	555	582	633	627	Syracuse
83	55	41	2.5	—	
1309	1372	1440	1639	1570	Charlotte
205	136	102	6.1	—	
1011	1060	1112	1238	1212	Cincinnati
158	105	79	4.7	—	
651	682	716	785	781	Cleveland
102	68	51	3.1	—	
1457	1526	1602	1831	1806	Oklahoma City
228	152	114	6.8	—	
118	124	130	146	138	Portland
18	12	9	.56	—	
801	839	880	983	959	Philadelphia
125	83	63	3.8	—	
495	518	544	594	593	Pittsburgh
77	52	39	2.3	—	
1748	1831	1922	2257	2095	Charleston
273	182	137	8.2	—	
1299	1361	1428	1621	1557	Knoxville
203	135	101	6.1	—	
2070	2169	2277	2635	2482	Memphis
323	216	162	9.7	—	
1583	1659	1742	1991	1899	Nashville
247	165	124	7.4	—	
3152	3303	3467	4114	3884	Brownsville
492	328	246	14.8	—	
2622	2747	2884	3337	3231	Dallas
410	273	205	12.3	—	
2316	2427	2548	2731	2855	El Paso
362	241	181	10.9	—	
2536	2657	2790	3310	3040	Houston
396	264	198	11.9	—	
2356	2469	2592	2984	2903	San Antonio
368	245	184	11.0	—	
1000	1048	1100	1146	1199	Salt Lake City
156	104	78	4.7	—	
1179	1236	1297	1487	1414	Norfolk
184	123	92	5.5	—	
55	58	61	63	63	Seattle
8	6	4	.26	—	
750	786	825	921	899	Charleston
117	78	59	3.5	—	

Operating Costs for Residential Air Conditioning

(*Continued from page 69*)

entering the condenser. Similarly, for cooling tower systems, the condensing temperature may be assumed to be 30 deg above the average WB temperature of the air entering the tower. The average DB and WB temperatures shown in columns 4 and 5 of Table A were specifically computed for this purpose.

The evaluation of both the (P/C) and the (Q/C) ratios for waste water systems depends, of course, on entering and leaving water temperatures, rather than on weather. These ratios are related to entering and leaving water temperatures in the manner shown at the bottom of this page. Values of (P/C) and (Q/C) for various entering and leaving water temperatures are shown in Table C.

There remains the evaluation of (Q/C) for cooling tower systems. This is a constant, the value of which is 0.075×10^{-4}.

Summarizing what we have learned to this point:

1) For waste water systems, (P/C) is dependent upon condensing temperature, and therefore upon entering and leaving water temperatures. (Q/C) is dependent directly upon entering and leaving water temperatures.

2) For cooling tower systems, (P/C) is dependent upon condensing temperature, and therefore upon seasonal average WB temperature. (Q/C) is a constant.

3) For air cooled systems, (P/C) is dependent upon condensing temperature, and therefore upon seasonal average DB temperature. (Q/C) is, of course, zero.

4) For all systems, $[D/(t_m - 70)]$ is a function of weather data only, and therefore a constant for any given city.

These relations of (P/C), (Q/C), and $[D/(t_m - 70)]$, and the weather data in Table A were used to compile Table D. A sample evaluation of these factors for Little Rock, Ark. is shown on page 76.

Determining Values from Table C

The method of determining values of (Q/C) and (P/C) shown in Table C is as follows:

1) Condenser heat rejection $= 500 \times GPM \times (LWT - EWT)$ in which LWT = leaving water temperature; EWT = entering water temperature.

2) Condenser heat rejection $= 1.25 \times C$ in which 1.25 = average condenser heat rejection factor to account for compressor power input.

3) Then,

$$[500 \times GPM \times (LWT - EWT)] = 1.25\,C$$

and

$$(Q/C) = 1/[400 \times (LWT - EWT)]$$

Values of (Q/C) for various entering and leaving water temperatures are given in Table C.

4) For the unit studied, condenser performance is

plotted as a curve of *GPM* vs. $[CHR/(CT - EWT - 1)]$ in which *CHR* is condenser heat rejection; *CT* represents condensing temperature, and the value of 1 accounts for hot gas line pressure drop. Substituting from step 2 above, this is a curve of *GPM* vs. $[(1.25 \times C)/(CT - EWT - 1)]$.

5) A value for *C* is assumed and the corresponding *CT* noted. (Q/C) is multiplied by the assumed value for *C*, to arrive at a trial *GPM*. Then a curve value for $[1.25C/(CT - EWT - 1)]$ is read from the condenser performance curve.
6) The assumed value for *C*, and the corresponding *CT*, are then used to arrive at a calculated value for $[1.25\ C/(CT - EWT - 1)]$. This calculated value is compared to the curve value from step 5, and by trial and error, when they agree a relation between condensing temperature and entering and leaving water temperatures has been established.
7) A sample calculation of (Q/C) and *CT* is shown below. Values of condensing temperatures, and corresponding (P/C) values, for various entering and leaving water temperatures are given in Table C.

Sample Calculations

	First Test	Second test
EWT, given	75	75
LWT, given	95	95
$(Q/C) = 1/400 \times (LWT - EWT)$	1.25×10^{-4}	1.25×10^{-4}
C, assumed	22,100	22,700
CT, from unit rating	105.0	100.3
$GMP = (Q/C) \times C$	2.76	2.84
$[1.25\ C/(CT - EWT - 1)]$, curve value	1145	1168
$1.25\ C/(CT - EWT - 1)$, calculated value	953	1168

Determining (Q/C) for Cooling Towers

The method of determining value of (Q/C) for cooling tower systems is as follows:

1) Heat rejection = 1.25 × C
2) Heat rejection = 1000 × lb per hr water evaporated, in which the value 1000 is assumed to be the heat of vaporization of water (Btu per lb).
3) Pounds per hr water = GPM × 8.33 lb per gal × 60 = 500 × GPM
4) $1.25 \times C = 1000 \times 500 \times \text{GPM}$
   $(Q/C = 1/400{,}000$
5) This value of (Q/C) accounts for only the evaporated water. Assuming the losses from bleed-off or drift are twice the losses from evaporation, the total value of (Q/C) is therefore equal to 3/400,000, or 0.075×10^{-4}.

Sample Problem

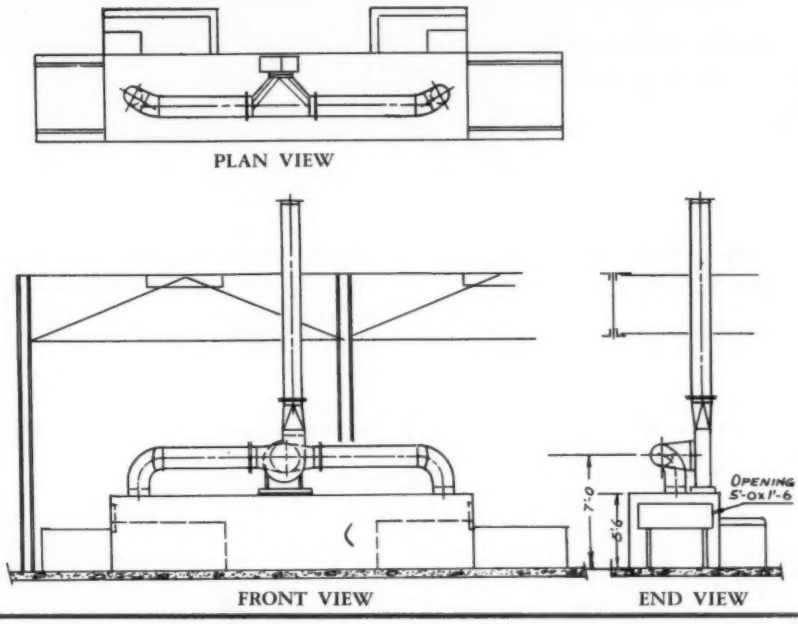
The method of determining seasonal power and water consumption per ton for Little Rock, Ark., is as follows:

1) $[D/(t_m - 70)] = 70.1$
in which *D* (from Table A) is 1191; t_m from Table A = 87.

2) Waste water system
***EWT* (given) = 75**
***LWT* (given) = 95**
(*P*/*C*), from Table C = 0.954×10^{-4}
$K_t = 288{,}000 \times (P/C) \times D/(t_m - 70)$ or 1925 kwh
(Q/C) (from Table C) = 1.25×10^{-4}
$W_t = 17{,}280 \times (Q/C) \times [D/(t_m - 70)]$ or 151,000 gal

3) Cooling tower system
t_{awb} (from Table A) = 70.5
$CT = t_{awb} + 30$ or 100.5
(*P*/*C*) (from Table B, interpolating) = 1.222×10^{-4}
$K_t = 288{,}000 \times (P/C) \times [D/(t_m - 70)]$ or 2466 kwh
(Q/C) (a constant) = 0.075×10^{-4}
$W_t = 17{,}280 \times (Q/C) \times [D/(t_m - 70)]$ or 9100 gal

4) Air cooled system
t_{adb} (from Table A) = 82.5
$CT = t_{adb} + 30$ or 112.5
(*P*/*C*) (from Table B, interpolating) = 1.151×10^{-4}
$K_t = 288{,}000 \times (P/C) \times [D/(t_m - 70)]$ or 2322 kwh



1 BULLNOSE TEE at the fan connection for an overhead exhaust system used with a process washer. Tee connections remove the hazards created by standard fittings when they extend over the equipment operator's working area

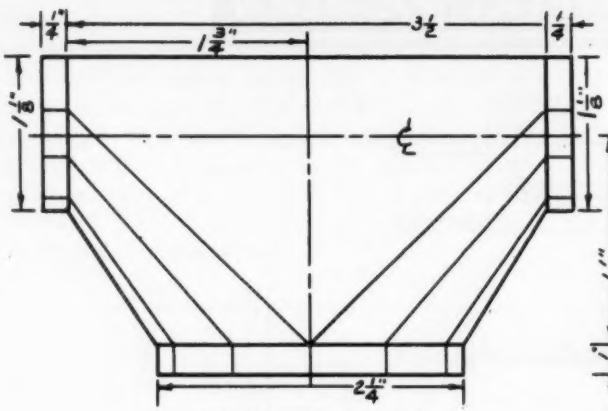
Development of a Bull Nose Tee Fitting

. . . with two equal branch diameters for application where space is at a premium

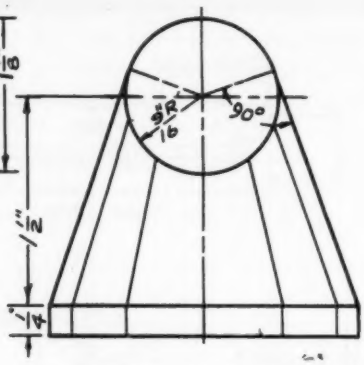
SPACE LIMITATION often makes it necessary to design special duct fittings. The bullnose tee fitting at the fan connection (Fig. 1, plan view) is a typical example. The job specifications on the application shown here required that the exhaust ducts and equipment be confined within the area above the top of a process washer. The equipment used was 7 ft high. Any protruding duct work or fume exhaust equipment would be a traffic hazard around the washer. To meet the job specifications a short 90 deg turn fitting had to be designed; the bull tee fitting was the practical solution.

An error often occurring in the solution of a pattern problem of this type is the failure to locate the tangent point (shown at point W, Fig. 4). Too often the center line (Fig. 2) is used with a resultant distortion in the fitting. A slight brake is required on the center line (Fig. 2) to produce the required angle of line W-10 (Fig. 4).

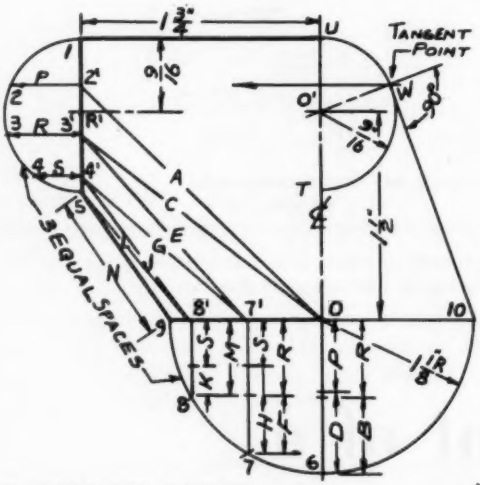
In the design of an exhaust system for an industrial washer, as used in this month's problem, it is usually desired to provide 250 cfm per sq ft of open area. It's been found that a velocity of 1800 fpm is most suitable



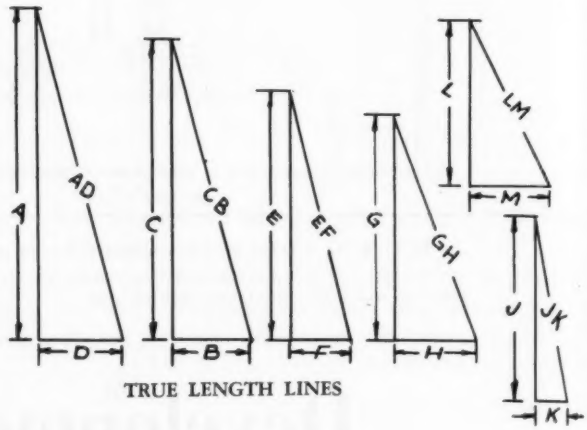
2 FRONT VIEW of tee fitting



3 END VIEW with dimensions

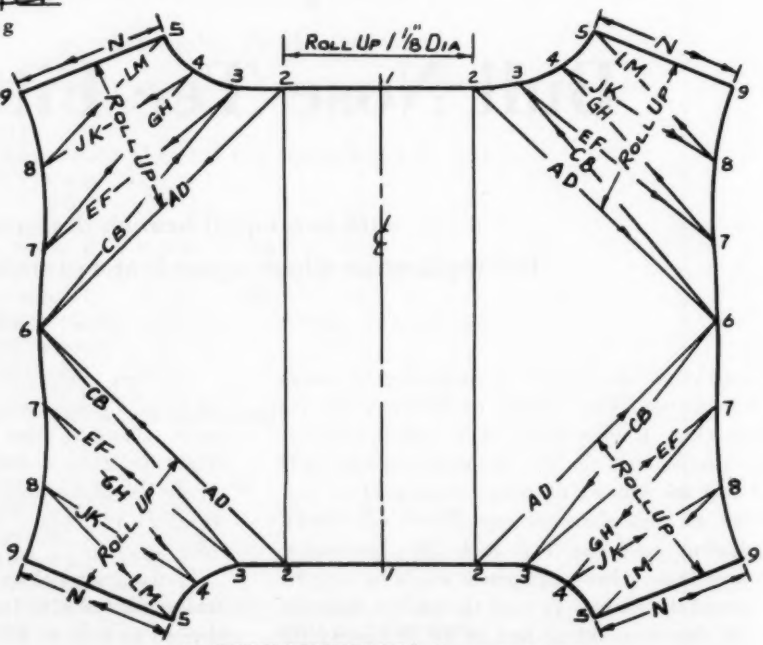


4 SIMPLIFIED LAYOUT using half front and half end views



TRUE LENGTH LINES

PICTORIAL VIEW



5 DEVELOPMENT OF bull nose tee pattern

for this type of application. In the end view (Fig. 1) a 5 ft 0 in. × 1 ft 6 in. opening is shown. This opening will be common to both ends.

The horizontal exhaust duct size at each end is determined by calculating the end opening in sq ft, multiplying the area by the given cfm per sq ft and dividing the result by the velocity. Thus:

1.5 × 5 × 250 = 1875 cfm

1875 divided by 1800 = 1.04 sq ft duct area

1.04 sq ft area is the equivalent of a 14 in. round duct

To maintain a stack velocity equal to that in the branch ducts, add the cross sectional area of the branches in sq ft; the total 2.08 sq ft is equal in area to a 20 in. diameter stack.

In an installation of this type where condensation is a major consideration, a 1 in. nipple should be provided at the bottom of the fan and a pipe should be connected from the fan to the washer. This will provide positive drainage and add to operating efficiency.

The following is the step by step procedure to the solution of the pattern development problem:

Simplified Method Drawing, Fig. 4 —

(a) Draw the vertical center line marked CL and establish point O. Through point O draw a line perpendicular to and extending on both sides of the center line.

(b) With point O as center and given radius 1⅛ in., draw a half circle below the horizontal line. Mark the intersection points of the half circle and the horizontal line with the numbers 9 and 10.

(c) Divide the left side of the half circle into three equal spaces. Mark the points 6, 7 and 8, and through these points draw lines perpendicular to and intersecting the radius line 9-O. Mark the points 7′, 8′ as shown.

(d) From point O on the center line, measure 1½ in. up and mark the point O′. With this point as center and given radius 9/16 in. (Fig. 3) draw a half circle to the right of the vertical center line. Where this arc intersects the vertical center line mark the points T and U. Draw a line from point 10 tangent to the half circle. Draw a line from radius point O′ perpendicular to and intersecting the tangent line at point W.

(e) Through point U draw a line to the left and perpendicular to the vertical center line O-U. Working from point U, measure 1¾ in. (from Fig. 2) and locate point 1. Draw a line through point 1 perpendicular to line U-1, measure the given diameter of the branch pipe which is 1 ⅛ in. (Fig. 2). Transfer this diameter to the vertical line from point 1 and mark the point 5.

(f) From point 1, transfer the radius of the branch pipe which is 9/16 in., and mark the point R′. With R′ as center and radius 9/16 in., draw a half circle to the left of line 1-5. Project point W parallel to line U-1 to intersect the half circle at point 2 on the arc. Divide the arc 2-5 into 3 equal spaces and through the points draw lines perpendicular to and intersecting line 1-5 at points 2′, 3′ and 4′.

(g) Draw the work lines A, C, E, G, J, L and N between points 2′, 3′, 4′, 5 and points 0, 7′, 8′ and 9.

(h) Designate line 2-2′ as line P, line 3-3′ as R and line 4-4′ as S.

To Lay Out the Full Pattern, Fig. 5 —

(a) Draw the vertical center line 1-1 which is 3½ in. Through both points 1, draw lines perpendicular to and extending on both sides of the center line. On Fig. 4, measure arc 1-2 on the 9/16 radius half circle, and working from points 1-1 on Fig. 5, transfer this length to both sides of the center line and mark the points 2. Draw vertical lines 2-2 on each side of the center line.

(b) Draw a right angle. From Fig. 4, transfer line A to the vertical leg. With a compass, measure line P on the 9/16 in. radius half circle. Subtract this length from line 0-6 on the 1⅛ in. radius half circle; mark the difference as length D. Transfer length D to the horizontal leg of the right angle and draw the hypotenuse line A-D. With A-D as radius and points 2 (Fig. 5) as centers, draw intersecting arcs and mark the points 6.

(c) Transfer line C from Fig. 4 to the vertical leg of a right angle. Subtract length R on the 9/16 in. radius half circle from line 0-6 on the 1⅛ in. radius half circle; mark the difference as length B. Transfer length B to the horizontal leg of the right angle and draw the hypotenuse line C-B. With points 6 (Fig. 5) as centers and radius C-B draw arcs. Measure chord length 2-3 on the 9/16 in. radius half circle and with points 2 (Fig. 5) as centers, draw arcs cutting arcs C-B and mark the points 3.

(d) On a right triangle, transfer line E from Fig. 4 to the vertical leg. Subtract line length R on the 9/16 in. radius half circle from line 7-7′ on the 1⅛ in. half circle and mark the difference as length F. Transfer length F to the horizontal leg of the right angle and draw the hypotenuse line E-F. With points 3 (Fig. 5) as centers and radius E-F, draw arcs. With chord length 6-7 (Fig. 4) as radius and points 6 (Fig. 5) as centers, cut the arcs E-F and mark the points 7.

(e) Line G is transferred from Fig. 4 to the vertical leg of a right angle. Subtract line length S on the 9/16 in. radius half circle from line 7-7′ on the 1⅛ in. radius half circle and mark the difference as length H. Transfer length H to the horizontal leg of the right angle and draw the hypotenuse line G-H. With points 7 (Fig. 5) as centers and radius G-H, draw arcs. Measure chord length 3-4 on the 9/16 in. radius half circle, and with points 3 (Fig. 5) as centers, draw arcs cutting arcs G-H, and mark the points 4.

(f) Line J is transferred from Fig. 4 to the vertical leg of a right angle. Subtract line length S on the 9/16 in. radius circle from the line 8-8′ on the 1⅛ in. radius half circle, and mark the difference as length K. Transfer

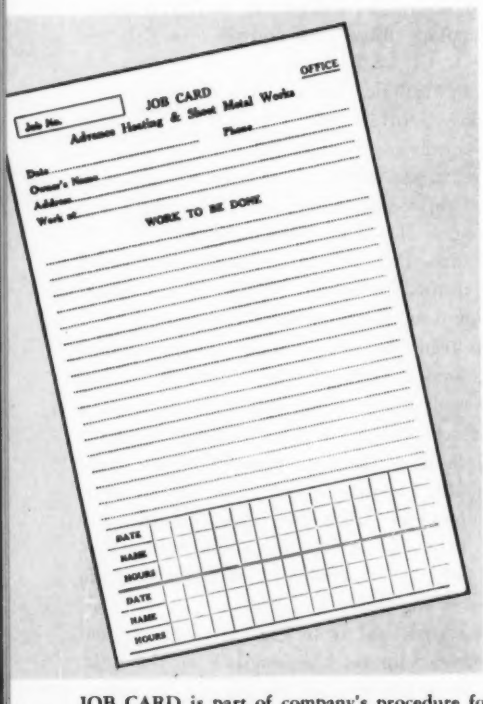
(*This article continued on page* 83)

"SALESMEN OUT FRONT" are the two rows of installation photos in the company's display room. Quilted sheet metal background attracts customers, shows what firm can do

Imaginative Selling, Engineering

Careful adaptation of equipment to specific needs and displays of installation photos are good selling tools. Careful job records help maintain good customer relations

By Donald C. Taylor



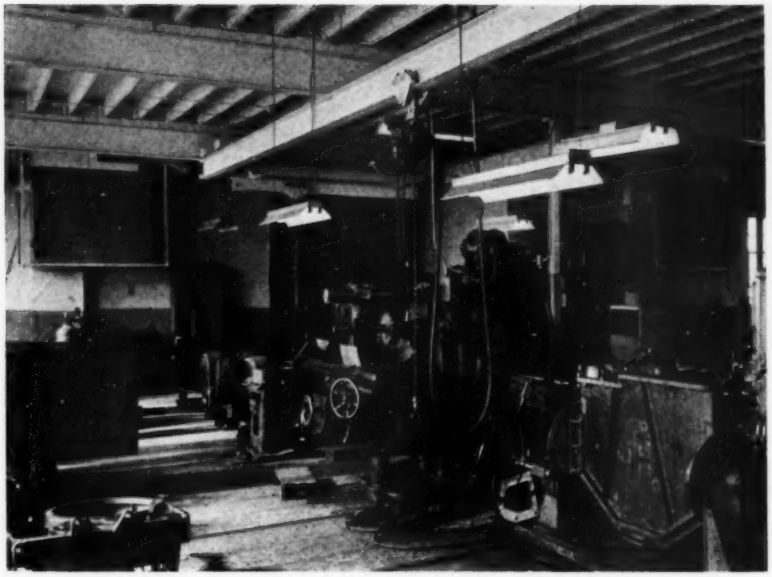
JOB CARD is part of company's procedure for keeping accurate records on all work. Similar card is used in the shop

THE ADVANCE Heating & Sheet Metal Works, Rock Island, Ill., has made many well-engineered heating installations in the tri-city area — Rock Island, Moline and Davenport.

Why does it receive numerous orders? This firm is not content to go after orders from the usual sources alone. It goes out to discover new ones.

Like many other companies, this firm will sell installations to merchants and wholesale houses as well as to homes. For instance, a recent installation was for four furnaces in an electrical supply house. However, the firm has also sold equipment for unusual installations such as an auction barn. A large number of churches and many individual farmers also augment the company's roster of customers.

For all these groups of prospects, the company provides new equipment or remodels older installations. It sells customers on the idea that warm air heating will provide



SPACE SAVING INSTALLATION was made by company for tool and machinery firm. Five suspended furnaces were installed (two are shown) to replace a large boiler. Boiler room is now a welding department; ceiling pipes came out, permitting use of overhead cranes

Keep Dealer Busy

the best service. And the company believes that any customer can be "sold" if he feels the equipment is geared to his specific needs.

For example, one farmer was sold a unit, at about $200, for heating a farrowing house. The heater uses bottled gas, is operated by a thermostat and keeps the temperature of the hog house at 60 F. The building is 32 × 60 ft in size. Bales of hay in the loft provide the only insulation. The farmer is using a single unit instead of individual heaters which he had used before. He finds that the pigs are hardier, eat more, grow more rapidly with the house heated in this fashion. The advantages of the installation were explained to this prospect who was "sold" when he saw how it would meet his special requirements.

How Prospects Are Reached and "Sold"

Part of the "ferreting out" of prospects is done by advertising. A rural farm directory and various types of urban advertising are used effectively. The company also has full coverage in the city telephone directories and has been a consistent advertiser in city newspapers. However, a $1000 neon sign recently installed in front of the building is being used — for the time being — in place of city newspaper space.

The company believes in using pictures to promote sales. These photos of actual installations are used as "salesmen out front." They do an effective selling job, the company feels, because many people know the customers for whom the installations have been made. They reason that if their friends are satisfied, they will be also.

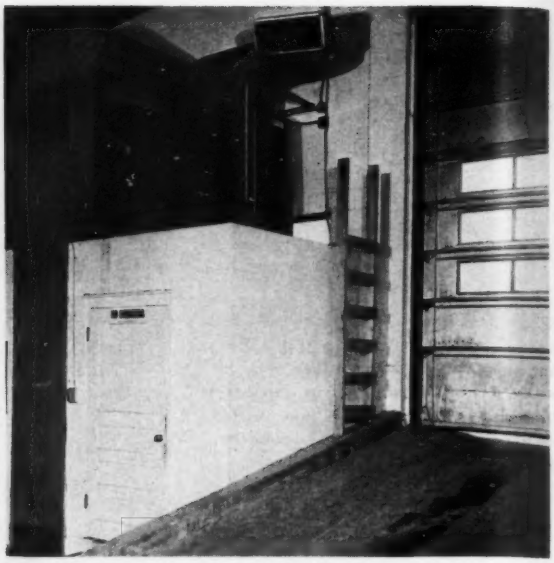
The company makes sure it has enough pictures to make a strong display and to illustrate all special features. Then bound books are made containing prints of the best photos. Stereoscopic viewing also is used to give the customers a more realistic picture of installations.

The company has originated a novel wall display which is effective as an advertising medium. In the main display room hangs a double row of 24 photos. Quilted sheet metal provides a gleaming background designed for customer appeal.

Installations Suited to Special Needs

Many of the company's installations illustrate skill in adapting equipment to specific requirements. Attention to individual needs is in itself a good sales tool, according to R. W. Scott, manager, who has familiarized himself with all the various types of installations and is not stumped by unusual requirements. The firm consistently uses ingenuity to provide workable, safe, practical and economical heating systems.

In making an installation, the company uses to the fullest possible extent the flexibility of warm air heating — which it considers not only suitable but preferable for many large buildings. The staff carefully figures heat losses and allows ample safety margins for unusual



GEARING JOB to special needs, Advance installed three separate furnaces for an auto dealer. One unit was suspended near entrance to service department (*left*) and another adjacent to drive-in entrance (*right*), while the third serves the various offices. This permits partial heating when only one or two sections of the building are open

Improved arrangement of heating equipment often makes for more even and efficient distribution without sacrificing valuable space

conditions. Furnace locations are very carefully chosen and a lot of thought is given to the proper register locations, etc.

An example of the company's versatile technique is the installation made for an auto dealer in a recently built 24,000 sq ft building. The company installed three furnaces: a gas fired furnace for the various offices and two oil fired furnaces in other sections. The latter were converted to gas firing when more gas became available. One of these units was suspended near the entrance to the service department (from the showroom), saving space, and the other was placed adjacent to the drive-in entrance to the service department at the rear of the building.

This installation met the special needs of the customer because a central heating unit for the entire building would have been wasteful, since the office and showroom were kept open at times when the rest of the establishment was closed.

Aim at Saving Space

The company's major aim for another installation (in a tool and machinery company) was to provide a new heating arrangement for more even and efficient distribution of heat without sacrificing space. Advance recommended and sold five oil fired furnaces to replace a large boiler. The former boiler room is now used as a welding department, increasing productive space. Pipes along the ceiling in the plant were removed, permitting the use of overhead cranes. Further, all furnace units installed are suspended, so that no working space is taken up.

In another installation, one of the several pieces of equipment was also suspended. The company had recommended that two furnaces be placed in twin suspension because the customer's heat load would require an increase in capacity at some later date (though one furnace could carry the load at the time of installation). In this instance, the customer preferred to try the one furnace temporarily, even though it might result later in a more expensive job (in terms of higher installation costs, etc). The example shows, however, that the company is ready to offer original recommendations, though it will follow through on customer preferences whenever possible.

The firm does many suspension jobs, feeling that this type of installation is often favorable to the best distribution of heat, nearly always saves space, and is relatively simple to install (with angle irons and welding used to hold units in position).

The company also has installed a number of sizeable air conditioning jobs. One such sale, in Moline, Ill., netted the firm about $5000 (for duct work and the

delivery system). Advance did not do the refrigeration work on the installation.

Business Methods Efficient

The company's shop is very well organized. It is large and is located on the ground floor for convenience. All varieties of material are readily accessible. The nine shop employees are instructed to keep the shop neat (checking this every hour) to avoid waste of time and material and to promote safety. Steel barrels are strategically placed for collecting loose scrap.

Good employee relations are maintained through special facilities offered. There is a hot water shower in the basement. A small refreshment room contains a refrigerator, in which are kept fruit juices, and an automatic coffee maker with cocoa and coffee mixes. Candy bars are also available.

Of course, the company feels that good customer relations — like good employee relations — mean good business. To facilitate rapid servicing, it maintains a fleet of four trucks, and there is a "control room" in the plant which aids in service work.

The job card system also cuts down on friction with customers because it facilitates careful record keeping. Two cards are used for keeping track of jobs — one in black and the other in red. One is kept in the office, the other in the shop. When an order first comes into the office, all the starting information is recorded on both cards and the job is assigned a number. When men turn in "time," it is recorded on both cards. From these cards, the company can tell who did each job, the exact materials used, and what the construction details were. The cards are often used to explain to customers why service work is in the offing.

A job book is also kept in which are entered the customer's name, type of job and job number. This job book provides a quick survey record of the number of jobs for the entire year. It may be used to gage who might need service work, and it shows what the ebb and flow of business has been. A single book normally runs for about two years.

As another business aid, the company draws up a monthly graph of sales.

Company Believes in Its Area

The Advance Heating and Sheet Metal Works is operated by R. W. Scott, in charge of sales, and L. L. Bunge, in charge of the shop. Carl W. Kimble, the company's owner, started the Advance Heating & Sheet Metal Works in 1939.

R. W. Scott follows a many sided program to make the most of this market area — with its industrial plants, government installations and railroads. He makes it his business never to be put off by the fact that an individual or firm has not been an active buyer. He also makes sure he understands the specific requirements of each installation, selling on this basis. In addition, he recommends the most appropriate equipment even if it has unusual features or is different from what the customer had anticipated.

Layout for a Bull Nose Tee Fitting

(*Continued from page 79*)

length K to the horizontal leg of the right angle, and draw the hypotenuse line J-K. With points 4 (Fig. 5) as centers and radius J-K, draw arcs. Measure chord length 7-8 on the 1-1/8 in. half circle (Fig. 4) and with points 7 (Fig. 5) as centers, cut the arcs J-K, and mark the points 8.

(g) Transfer line L from Fig. 4 to the vertical leg of a right angle, and line length 8-8′ marked M to the horizontal leg. The hypotenuse line marked L-M is the true length line. With points 8 (Fig. 5) as centers and radius L-M, draw arcs. Measure chord 4-5 on the 9/16 in. radius (Fig. 4) and with points 4 (Fig. 5) as centers, cut the arcs L-M and mark the points 5.

(h) Measure true length line N (Fig. 4) and with points 5 (Fig. 5) as centers, draw arcs. With chord lengths 8-9 (Fig. 4) as radius, and points 8 (Fig. 5) as centers, cut the arcs N and mark the points 9.

Through the developed points draw the pattern work lines and outline and mark the patterns for forming.

Developing the Collar Patterns

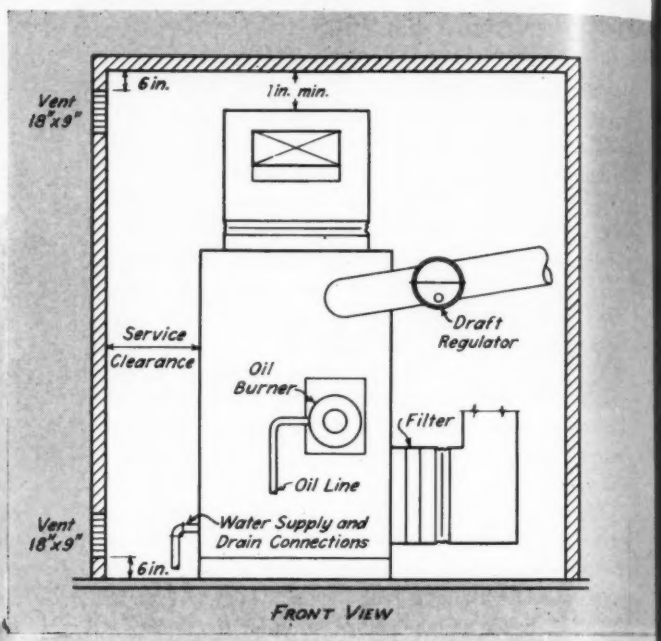
(a) To find the circumference of the large collar, multiply the given 2 1/4 in. diameter by 3.14; thus, 3.14 × 2.25 equals 7 1/16 in.

(b) Draw a rectangle equal to the collar circumference by the length, which is 7 1/16 × 1/4 in.

(c) To calculate the circumference of the small collar, multiply the given 1 1/8 in. diameter by the constant 3.14; thus, 3.14 × 1.125 equals approximately 3 5/8.

(d) Draw a rectangle with sides equal to the collar circumference by the length, which is 3 5/8 × 1/4 in.

Installation Procedures for Year 'round Air Conditioning

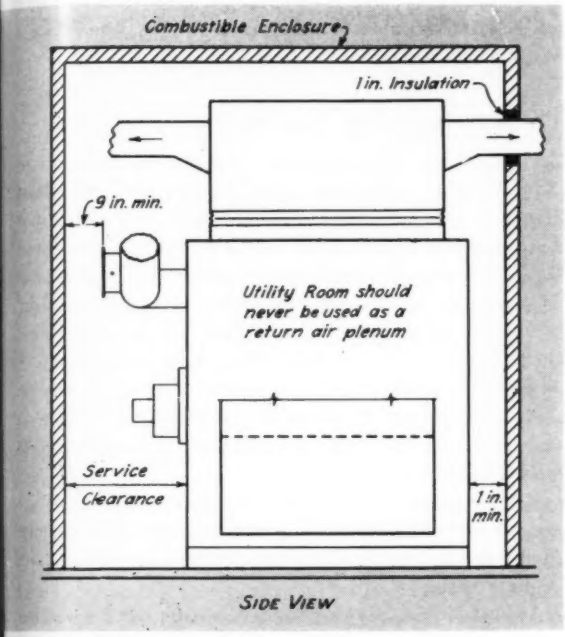


By S.W. Reid
Air Conditioning Engineer
Gilbert Associates, Inc.

Review of your inspection, delivery and installation techniques may show that habit has complicated your operation. A step-by-step outline of methods on a specific installation may iron out a few wrinkles

OUR PERSONAL LIVES are filled with routines which are repeated almost every day. The order of events upon arising in the morning, for example, is performed almost mechanically. So also are such things as driving an automobile, lighting a cigarette, buttoning a shirt or tying a necktie. Once in a while we awake from the world of habits to find ourselves in the midst of an action that concentrated thought would not allow. As the old story goes, whereas we habitually wind the clock and put the cat out, we may occasionally find ourselves trying to wind the cat and put the clock out.

Although our human tendency toward habit in personal routines is in most cases of no consequence, it is a factor in the business world that should be given frequent and serious consideration. Habits are often easier to prevent than to break, and for this reason constant alertness for poor business habits will usually be worthwhile. The natural awakenings which show up personal habits should not be relied upon to show up poor business habits because the revelation may not come in time to make corrections without loss.



INSTALLATION OF A year 'round unit in a confined space, showing proper clearances

In these articles we have discussed specific problems encountered by an air conditioning dealer or contractor in the normal course of business. Individually considered, each of the topics represents only a very small part of the operation. Taken collectively, however, the small parts fit together to make the business pattern. Continuous improvement can be achieved by giving constant attention to the many techniques which are parts of the pattern. Habit in the performance of routine business tasks should not interfere with discovering new and better ways of doing things.

Our topic this month is in essence another review of a way of doing things. Each dealer probably has performed the tasks described many times in his own way — so many times, perhaps, that the work and procedure are a matter of habit. A review of his procedures may stimulate new thought that can be applied toward improved efficiency.

Step-By-Step Procedure

Let's observe a dealer who has received an order from a homeowner for a year 'round air conditioner. We shall follow the events that take place from the time the order comes in until the unit has been installed and is ready for operation in the customer's home.

The unit is assumed to be a compact, self-contained combination furnace and cooling unit in a common enclosure and fired by oil. The cooling and heating load estimates prepared by the salesman show that a unit having two tons of cooling capacity and 84,000 Btuh bonnet output heating capacity will be adequate. Accordingly, the dealer places an order with his distributor for the required equipment and auxiliaries.

When the unit is received in the dealer's shop it will most likely be packed in more than one carton, although some of the smaller cartons may be packed inside the largest one. This arrangement makes for compactness and permits flexibility. Thus, the basic furnace may be shipped with oil or gas burning equipment. A variety of

FIRST WE EXPLAINED FUNDAMENTALS

. . . in Mr. Reid's series of 20 articles (concluded in the May, 1954 issue). The basic operating characteristics of residential cooling equipment were described in detail.

NOW SPECIAL ATTENTION TO SPECIFIC PROBLEMS

. . . in a new series based on the author's wide experience in the field. Pointers on service and application techniques have been presented in the following issues:

1) Sheet metal contractor installs year 'round air conditioning system in branch bank (June 1954).

2) How to service hermetic condensing units (July 1954).

3) Keeping cooling coils operating at peak efficiency (August 1954).

4) Refrigerants for residential air conditioning systems and how they perform (September 1954).

5) Methods used to lubricate residential cooling systems (October 1954).

6) Locating troubles and what to do about them (November 1954).

7) How to charge a summer cooling system (December 1954).

8) Making maintenance contracts pay off in sales and service (January 1955).

9) Setting up an air conditioning department (February 1955).

CHECK LIST FOR UNIT INSTALLATION

1. *Inspect shipment* — file claim for shipping damage.

2. *Inspect site* — determine adequacy of the physical space, floor strength, combustion air ingress and chimney.

3. *Move unit to site* — keep in the original crate to prevent damage.

4. *Uncrate* — follow directions; keep the skid under the unit.

5. *Remove panels* — take out shipping materials, install accessories, inspect.

6. *Shift to permanent location* — remove the skid; level the installation.

7. *Make sheet metal connections* — install the ducts and flue.

8. *Make plumbing connections* — connect water and drain lines, water regulating valve, oil line.

9. *Make electrical connections* — mount the controls and disconnect switches.

10. *Check cooling function* — lubricate; adjust fan speed and belt tension; check for leaks, rattles, capacity; check controls; adjust air distribution.

11. *Check heating function* — check fuel rate, air and draft; check controls; adjust air distribution.

12. *Instruct owner* — leave printed instructions; discuss warranties; leave phone number for service.

controls or control combinations, packed separately, may also be supplied as required. In some lines the furnace and cooling system are packed separately permitting a customer to buy the furnace first and add the cooling system later.

When the packages are received they are thoroughly inspected for evidence of damage in transit. All packages bearing signs of mishandling are opened and the contents are examined. If damage is evident, the fact is noted on the carrier's freight bill. A separate written request for inspection by the carrier's agent is made at once.

The shipment is also checked against the order and the packing list for completeness and correctness. Electrical characteristics of the equipment and controls are noted and compared with requirements. If the furnace is to be gas fired the gas equipment is checked to make certain it is correct for the type of gas supply. Shortages or incorrect items are reported to the responsible supplier.

The next step toward installation is the inspection of the site for adequacy of physical space, floor strength, combustion air ingress and chimney.

In considering physical space, it is necessary to add to the base dimensions of the unit the additional space needed for making water, drain and electrical, duct and flue connections. Adequate work clearances must also be allowed for. Finally, familiarity with local codes is essential to maintaining minimum safety clearances for warmer parts of the heating unit. A typical unit together with important installation dimensions is shown in the illustration at the beginning of this article.

Floor strength and provision for combustion air ingress are considered in planning the above-ground installation where the unit is located in a confined space such as a closet. Recommendations are shown on page 84 for a unit such as the one we are considering.

Chimney Inspection Important

Inspection of the chimney is especially important in an older home. All joints in the chimney are checked for tightness; the gas passage is checked to make sure it is free from obstructions such as loose bricks, tile or mortar. Top of the chimney must extend at least 24 in. above the highest point of the roof, and there should be no nearby obstructions such as adjacent roofs or trees to cause down drafts which interfere with proper performance. A flue from a water heater should enter the stack below the furnace flue entry. A minimum vertical stack of 15 ft is needed for the oil fired furnace in our example (a 5 ft stack is sufficient for gas).

After corrections to the site have been made the equipment is moved to the site. Marring of the finish or damage to the casing are minimized by leaving the unit in its original crate.

Most unit crates or cartons are built up from a wooden skid to which the unit is firmly bolted. The upper part of the crate is separated from the unit by soft packing materials which are not strong enough to prevent distortion of the crate should the unit be laid on its side. For this reason units are handled upright (skid down) insofar as possible. When a unit is moved on its side it is lowered gently onto long planks.

Air conditioning units are particularly vulnerable to shock since their construction combines heavy components bolted to light gage metal framework. Handling shocks impose severe loads at the bolting points which can bend or twist the frame. To minimize damage of this type, many manufacturers put their crated equipment through simulated shipping tests to determine where extra internal bracing and blocking is needed.

Let's assume the unit has been moved safely to the home where it is to be installed in a utility area at the end of a garage which is attached to the home. The unit is unloaded and uncrated in the garage.

The problem of uncrating is not solved by attacking the crate indiscriminately with a hammer and crowbar. This method is not only laborious and time consuming, but also may result in damage to the contents. The correct method is to follow the manufacturer's instructions if they are available; otherwise, the unit is probably fastened to the bottom of the crate and if the nails fastening the sides of the crate to the bottom are removed, it should be possible to lift the entire superstructure up and off. The bottom of the crate serves as a skid for the unit and should not be removed until the unit is in place.

". . . after all preliminary steps have been taken the unit is moved to its final location"

Before the unit is moved into its final position, all panels are removed so that parts such as the oil burner which are shipped separately may be installed and the unit inspected for damage, improper assembly and loose or missing parts. The unit data plate is checked for correct power characteristics. All shipping blocks and packing material which will not be accessible when the unit is in place are removed, as are compressor hold-down bolts which may become difficult to reach. After all preliminary steps have been taken the unit is moved to its final location and the skid is removed.

Once in place, the unit is leveled by the use of shims and cement grouting so that it rests solidly on all four corners and is sealed around all edges. In our example the unit is placed on a level 2 in. concrete pad in the utility area. If it had been mounted on a wooden floor, the use of a vibration isolation mounting would have been recommended. One quarter in. sponge rubber the full size of the unit bottom is often used, but many other materials — such as ½ in. glass fiber roof insulation — may be used with good results.

Making discharge and return air duct connections is the next step. Many year 'round units have a choice of return air location. The unit we are considering has three alternate locations: bottom, rear and right side. Special attention must be given accessibility of the air filter when the various return locations are studied.

Return Air Connections

The choice of return air location is usually made long before installation, so we assume the right side connection is most desirable. The unit in our example is shipped with a standard return air opening through the bottom. To convert to the right side arrangement it is necessary to cut a hole in the lower right panel as outlined by four knockouts. Filters are removed from the bottom of the unit and installed in a filter rack available as an accessory for external mounting. A flexible connection in the duct will reduce vibration carryover from the unit to the duct.

The discharge opening usually has a plenum from which the trunk ducts take off. The plenum, like the return duct, is also attached to the unit through a flexible connection to prevent transmission of vibration to the duct system.

With the air duct connections complete, the flue connection is made. The unit (assumed to have an oil burner) has a front breeching and draft regulator, which are next attached; then the flue is run to the chimney. A 6 in. flue is recommended by the unit manufacturer although local regulations are the guide for the flue and chimney system. A ¼ in. per ft minimum upward slope of the flue toward the chimney has been found effective. The flue must not project beyond the lining in the chimney. It is sealed in with an approved cement.

With the sheet metal work complete, attention is given to plumbing. The unit requires four connections, for condenser water supply, condenser water discharge, condensate drain and oil supply line.

We assume an adequate and economical supply of city water is available at a pressure of about 55 psi, well below the 100 psi or higher level where a pressure reducing valve is required but above the minimum of 25 psi pressure required when a water regulating valve is used. This valve is usually considered an accessory since many standard units are shipped without the valve. The water valve is installed in the condenser water inlet line so the condenser will not be under water pressure when the valve is closed as would be the case if the valve were in the outlet line.

The capillary tube from the water valve is attached to the port provided on the discharge shutoff valve at the compressor. This back-seating valve closes the discharge line when turned in one direction and closes the water regulating valve port when turned in the reverse direction. The operating position of the discharge valve is intermediate, leaving the water valve port and the discharge line open.

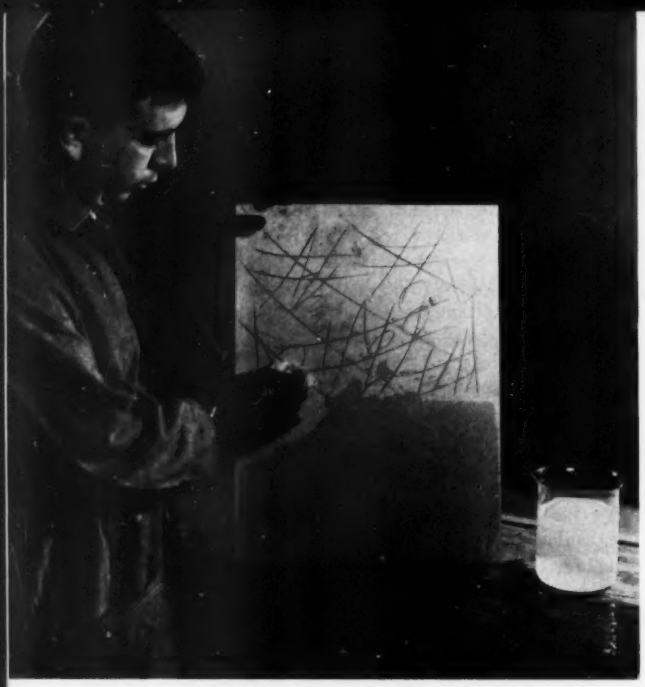
The condenser water outlet line is run to an open sump which drains through a trap to the sewer. An existing floor drain or sink may be utilized for the purpose. If no sump is handy, one may be constructed as a small standpipe at least 18 in. tall and several sizes larger than the waste pipe. The standpipe is connected to the sewer through a trap. Most local codes require an air gap between the overflow point of the sink or standpipe and the lower end of the waste pipe to eliminate possibility of water being siphoned back into the supply water system and contaminating it.

The line which drains the cooling coil condensate pan is run as a separate line to the sewer rather than connected into the condenser water waste line, which might allow water to flow into the drain pan and flood the unit.

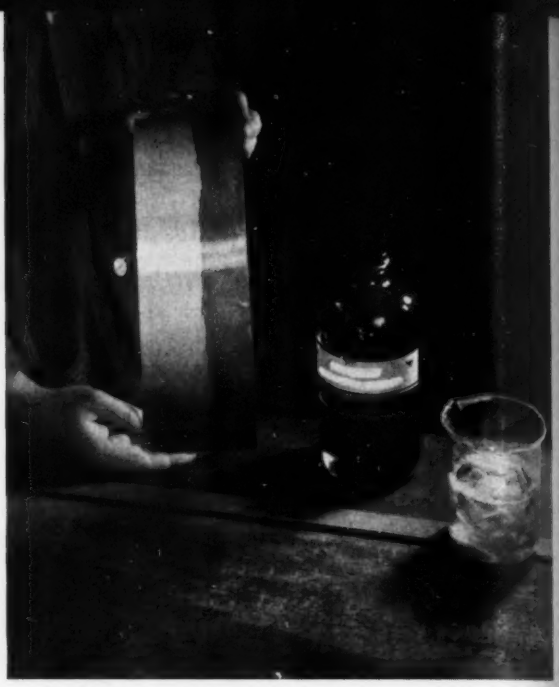
Connecting the Oil Line

The oil line is the last to be run to the unit. We shall assume the fuel oil tank is located in the garage

(This article continued on page 95)



EFFECTIVE REMOVAL of grease marks, stencils or fingerprints employs detergent and water with carbon tetrachloride added



SOLVENT ACIDIC SOLUTION removes discoloration from heat, acid flux or iron particles which have become imbedded

How to Clean Stainless Steel

Removal of dirt, grease, flux, discoloration and imbedded particles can prevent headaches later on. Here are some tested techniques for effective cleaning

By E. M. Rains
Armco Steel Corp.

THE IMPORTANCE of proper cleaning of stainless steel, both in the shop and in service, cannot be overemphasized. Appearance is not the only factor to be considered; clean equipment is usually durable equipment because of the corrosion and other factors which are eliminated in cleaning.

Most cleaning procedures are simple. Many of the problems which arise concerning stainless steel installations could be avoided by adequate cleaning. The following recommendations are based on laboratory tests and exhaustive studies.

Cleaning in the Shop

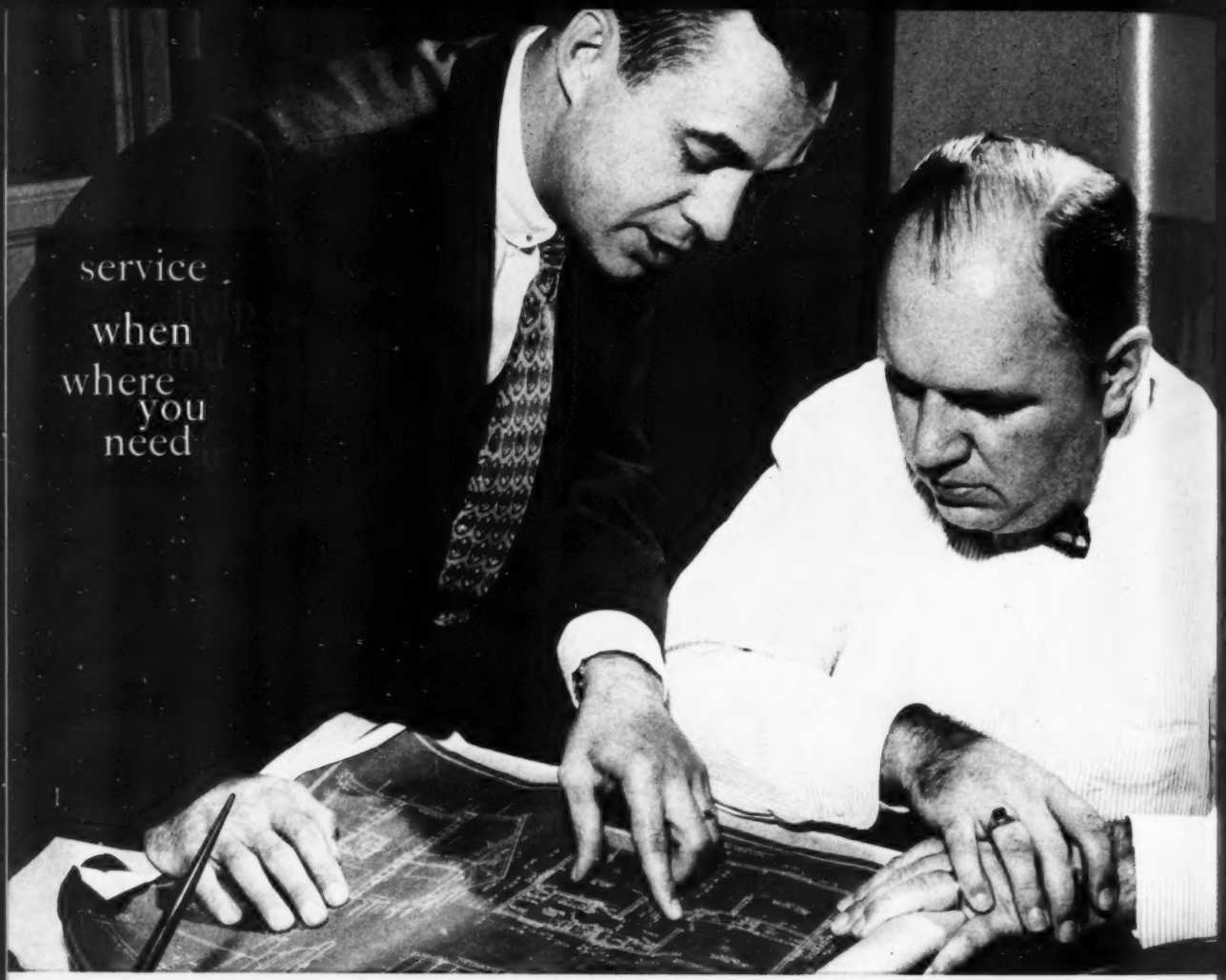
Some sheet metal contractors consider cleaning in the shop an unnecessary expense. Yet failure to clean equipment before it goes into service often leads to poor performance and sometimes to early failure. The expense of replacing or repairing such equipment usually far exceeds the cost of cleaning beforehand.

There are several steps in the shop where proper cleaning means a satisfactory job.

Dirt and grease on surfaces to be welded or soldered make for unsound welds or weak soldered joints, and should be cleaned from joint areas with a solvent such as gasoline, turpentine, naphtha or alcohol.

After welding, scale is removed to prevent discoloration and rusting in service. Chipping or brushing with a stainless steel wire brush are most effective methods of scale removal.

Heat discoloration at and near welds not only can be a starting place for corrosion, but also detracts from appearance. Even though welds are not ground flush discoloration should be removed. An efficient method for

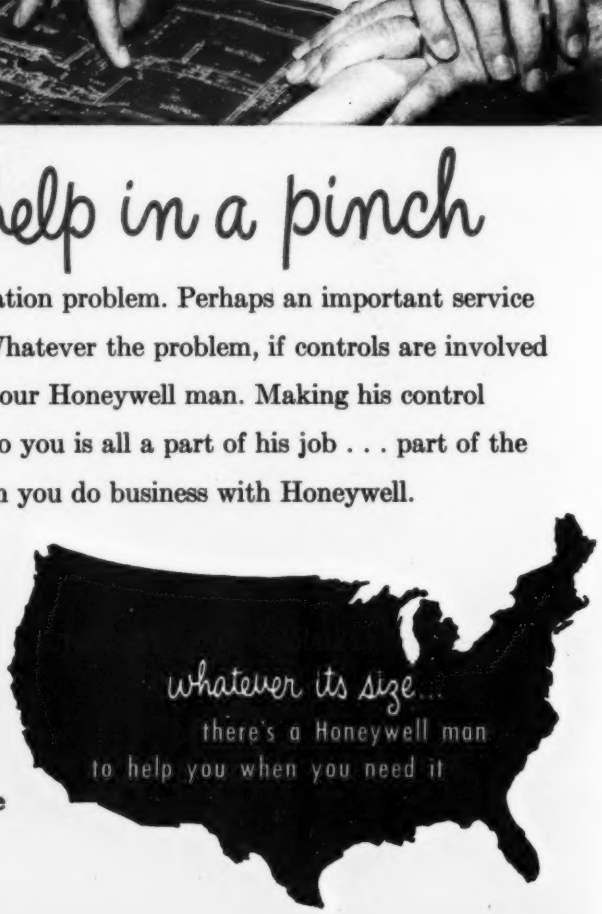


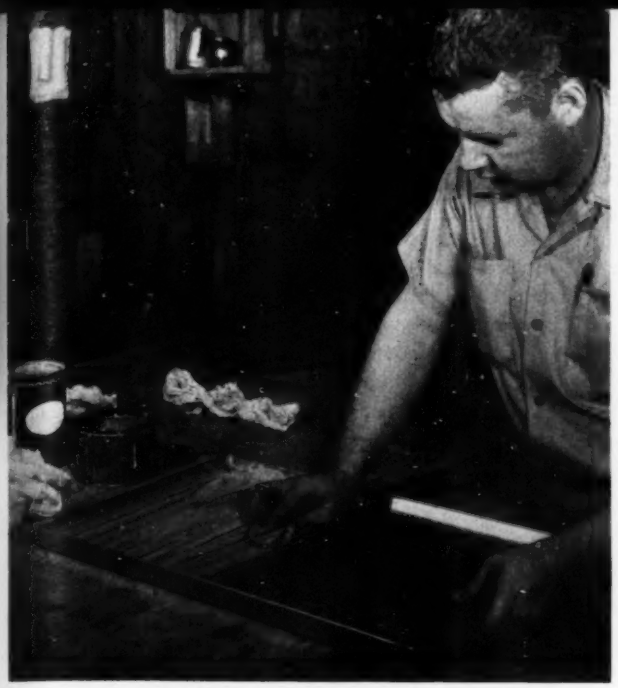
Personal help in a pinch

It could be a particularly tough application problem. Perhaps an important service call has your trouble-shooters stumped. Whatever the problem, if controls are involved it's a good time to get in touch with your Honeywell man. Making his control know-how and experience available to you is all a part of his job . . . part of the extra benefits that are yours when you do business with Honeywell.

MINNEAPOLIS
Honeywell

First in Service





FINE CLEANING POWDERS are wiped parallel to polish lines to remove light dirt and fingerprints from stainless steel

PLENTY OF WATER and soft scrub brush remove flux after soldering

discoloration removal is the alternating current electrolytic process, information on which can be obtained by writing the author.

Another method is scrubbing a paste of pumice or household cleaners and water on the weld seam with a toothbrush. A similar paste is made of pumice and a commercial liquid acidic material with solvents instead of water. (Further use of the solvent acidic material is described later in this article.)

Soldering Flux Must Be Taken Off

One of the most common causes of corrosion in stainless steel equipment is soldering flux left on the surface. Purpose of the soldering flux is to etch and roughen the metal surface to hold the solder. But if excess flux remains on the surface it will in time discolor and even corrode or perforate the metal. Removal of the flux after soldering is an absolute must.

Neutralizing the acid in the flux with ammonia or washing soda solutions is not enough. Such preparations will take care of the free acid but in so doing form additional salts and spread them over a larger area, often leading to severe pitting and rusting.

Thorough removal of soldering flux requires scrubbing with an ordinary scrub brush and plenty of clear water; hosing is desirable; if a bucket is used, the water must be changed frequently. After scrubbing, another hosing or washing with clear water is important.

Removal of flux immediately after soldering prevents discoloration or rusting which otherwise might occur even before the equipment leaves the shop. If discoloration does occur, a cleaning with the acidic solvent should remedy it effectively.

Chemical Cleaning After Fabrication

Even when weld discoloration and soldering flux are removed bits of metal and dirt which are sometimes attached to or imbedded in the work during fabrication may rust and cause discoloration or even start rusting of the stainless steel itself and lead to pitting.

So chemical cleaning, sometimes called passivation, is in order after fabrication. The following method is recommended:

Dip the fabricated part in a 20 percent nitric acid solution at 120 to 140 F, allowing it to remain 20 to 30 minutes. Then rinse the part thoroughly with clear water. Dipping may not be convenient in a small shop and of course is not practical with large assemblies. Good results usually can be obtained by swabbing the work several times, letting it remain wet for 30 minutes, then rinsing it thoroughly with clear water before drying. Goggles, rubber gloves and rubber apron should be worn during dipping or swabbing operations.

Nitric acid will not readily remove imbedded particles of iron that have completely rusted. In such cases the fabricated part is swabbed with a 25 to 50 percent solution of warm phosphoric acid, repeating as necessary and letting the work remain wet until all rust disappears. Then the part is rinsed with clear water and dried. The commercial solvent acidic material mentioned before also can be used for this purpose.

Some shops use a dry powder or paste to remove

fingerprints, dust, and other light accumulations from stainless equipment after fabrication. After application it is wiped off, taking the dirt with it. Whiting or fine household cleaning powders are also useful. But even the finest cleaning powders can scratch or burnish a mill-rolled finish. If a no. 4 or similar polish is used on mill finishes, rubbing or wiping should be in the direction of the polishing lines rather than across them.

Removal of Grease and Oil Stains

Stamped trademarks, stencil marks, grease pencil marks, fingerprints, oil, grease, tar, wax and other oily stains will come off in a sudsy solution of any good detergent and water to which carbon tetrachloride equal to one-fourth the detergent and water solution has been added. The detergent acts as a wetting agent; the carbon tetrachloride is a solvent. Trichlorethylene or other chlorinated hydro-carbon solvents can be used instead of carbon tetrachloride.

The mixture is stirred vigorously, wiped over the stain with a soft cloth (and rubber gloves), rubbed lightly or permitted to stand for a few minutes; then rinsed with clear water. If the markings are not completely gone the operation is repeated or followed with the acidic solvent treatment.

Caution: Carbon tetrachloride should be used only in well-ventilated places as it is toxic to breathe for any extended period or in high concentrations. While its vapors are not flammable or explosive, smoking is unwise during its use. Drawing carbon tetrachloride vapors through burning tobacco forms a poisonous gas, phosgene. The same is true of trichlorethylene and other chlorinated hydrocarbons.

Cleaning in Service

Simple washing with soap or detergent and water followed by a clear water rinse will clean most household, commercial and institutional equipment. If the water is hard, drying with a soft cloth will prevent water spotting. Household detergents will also remove fingerprints and grease. Treating with paste wax puts a thin wax film on the surface which resists fingerprinting — any fingerprinting that occurs can be easily removed by wiping with a cloth.

Spots which resist soap and detergents usually can be removed by ordinary household cleaning powders. Stubborn spots or discoloration may require a special stainless steel cleaner or stainless steel wool — never ordinary steel wool.

Chemical Cleaner for Tough Jobs

There are certain discolorations, rust and dirt that resist normal cleaning methods. The solvent acidic cleaner will often solve the problem.

This solution will remove dirt, grease, heat tint, light and heavy discoloration, and rust and discoloration caused by soldering flux. It is harmless to stainless steel if no chlorides are present on the surface. To insure against the presence of chlorides, a preliminary rinse with water is desirable.

One part acidic solvent is mixed with two parts water in a stainless steel, glass, porcelain enamel or wood container. Synthetic rubber gloves should be worn by the operator, and goggles and aprons are advisable, even though the solution is relatively non-hazardous. The stainless surface is rinsed thoroughly with clear water and the solution is swabbed over the area to be cleaned, using a clean cloth or sponge. After standing 15 to 20 minutes the surface is rinsed with clear water and dried with a soft cloth. If the surface still isn't clean and bright the operation is repeated.

The acidic solvent is not likely to harm paint, woods or fabrics. It will probably leave a dull gray color on galvanized steel and should not be permitted to remain in long contact with rubber.

Some restaurant and kitchen operators have reported that stainless steel equipment develops a straw-colored surface film after several years. In some cases "light spots" on stainless steel appeared where acid foods were spilled. Apparently the spots were restored to their original appearance by the acid in the foods.

This surface film evidently is caused by a combination of detergents and hard water used for routine cleaning over a period of time. It will form on any material but is more noticeable on stainless steel. The acidic solvent treatment will take off this film.

Outdoor Installations

Outdoor architectural installations should be cleaned periodically to remove surface dirt. In corrosive atmospheres, such as along the seacoast, frequent cleaning is recommended to help prevent possible discoloration or pitting. Soap or detergent and water plus a rinse should do the job. Wiping is called for if the water is hard. Other cleansers described in this article can be used as required.

This cleaning practice has been reported highly successful on large outdoor architectural installations in industrial atmospheres. One-fourth pound of a commercial wetting agent is mixed with 1½ gal of a commercial liquid emulsifier. Enough hot water is added to make a solution of 5 gal which is mixed thoroughly. Enough of the solution is added to a commercial polishing powder to make a paste. The paste is applied with a cellulose sponge, preferably working in the same direction always. Another sponge is used for rinsing with clear water. A squeegee can be used for drying.

Industrial Equipment Poses Special Problems

Owners of stainless steel industrial equipment often have a special cleaning problem because usually their

"...sure glad it was a Sequoia!"

GOOD FURNACE DESIGN

is important lots of ways. This picture illustrates one: cost of basic design at the time of installation.

Installation time is a straight dollars and cents matter to any dealer—potential profit you didn't make, or the difference between a winning bid and an also-ran.

Little wonder installers tackle tight-spot jobs a lot happier when it's a SEQUOIA *Closeteer* or *Rev-flo.* After all:

With their wide face, extremely shallow depth dimensions, every connection point is right on the face of the furnace within quick, easy reach. Plenum and flue outlets attach without stretching. Naturally installation goes faster!

SEQUOIA's good design is good business for you. This is ONE reason why; there are more. Write us for details of the full SEQUOIA line and address of your near-by sales office.

Reading this, Mr. Dealer, has it occurred to you this also is a strong point you can use to sell your services to builders.

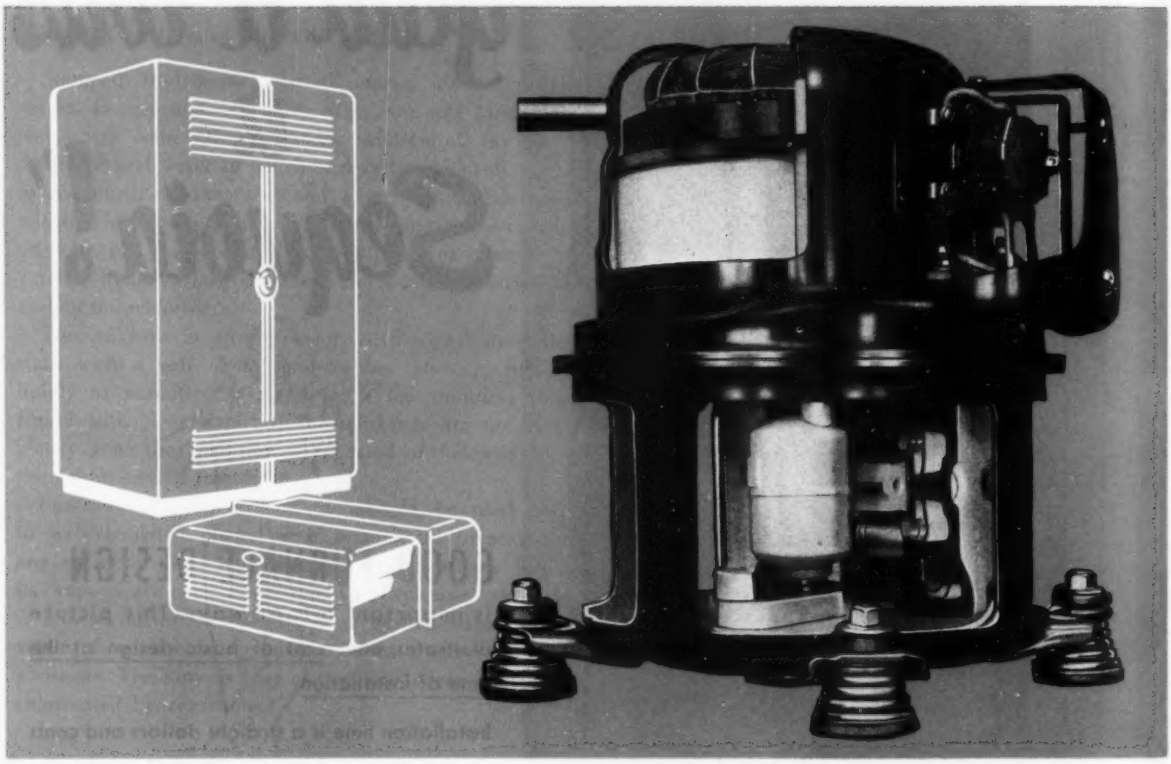
FORCED AIR GAS FURNACES and AIR CONDITIONERS

SEQUOIA MANUFACTURING CO.

1000 BRITTAN AVENUE • SAN CARLOS, CALIFORNIA

WHISPER-QUIET **POWER**

for package Air Conditioning



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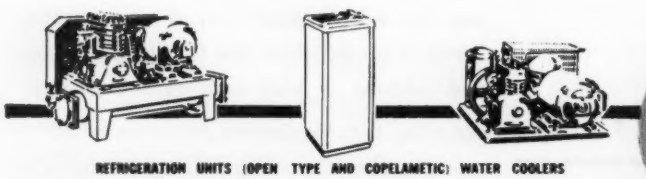
It takes real engineering (and knowledge of your customers' needs) to produce a welded motor-compressor that combines positive performance, vibration-free smoothness, and maximum operating economy.

Copeland gives you these design advantages and more . . . plus precision manufacture using finest components. Heavy-duty, high-power-factor motor delivers power aplenty with minimum current consumption. Freon-12 and Freon-22 models available. Use of Freon-12 can give you as much as 75°F. lower temperatures in windings, crankcase, oil and discharge side. Unusually high capacities make Copelaweld motor-compressors adaptable to virtually every type of duty.

Power all your air conditioning and refrigeration equipment with Copeland motor-compressors. It's *the* quality equipment that enhances your reputation by its long-run, trouble-free service.

Get full details . . . write today for complete information on the profit-making Copeland line.



REFRIGERATION UNITS (OPEN TYPE AND COPELAMETIC) WATER COOLERS

Copeland
DEPENDABLE Electric REFRIGERATION

COPELAND REFRIGERATION CORPORATION · SIDNEY, OHIO

equipment must be free of contamination. Sanitation is sometimes an important factor too.

The cleaners mentioned here will be sufficient for much routine cleaning. A combination of steam and hot water is another method; air drying after cleaning is essential when this method is used.

A nitric acid solution up to 40 percent or hot caustics are sometimes employed, and should be followed with a warm water rinse and air drying.

Sterilizing is done with either chemicals or applications of heat. Chemical sterilizers such as hypochlorite and trisodium phosphate solutions will not injure stainless when properly used. They should not be left in contact with the stainless steel for more than two hours at a time. The piece should be rinsed with steam or hot water, then air dried.

Heat sterilizing can be done by filling the equipment with water at 170 F to 180 F for five minutes. When live steam is used the steam hose should be held at least 18 in. away from the stainless steel surface to prevent particles of rubber from sticking to the surface.

Note: For names of the commercially available polishing and cleaning solutions write the author, E. M. Rains, Marketing Service Dept., Armco Steel Corp., Middletown, O., or the Editorial Dept., American Artisan.

Installation of Year 'round Air Conditioning Unit

(*Continued from page* 87)

area and the line had previously been buried in the floor between the tank and the unit. When the unit is installed it is necessary only to connect the line to the oil pump which is a part of the burner assembly.

The final connections are the power and control wires. Two separate fused disconnect switches, for the oil burner and cooling unit, are mounted on the wall of the utility area within sight of the air conditioner. Power leads are run to the unit through flexible conduit. Wire sizes are chosen in accordance with recommendations of the manufacturer, and wiring is done according to applicable codes.

The heating-cooling thermostat is mounted on an inside wall about 5 ft above the floor where it is subject only to average room temperature. The location chosen permits free circulation of air without obstructions such as doors or large pieces of furniture. The home owner is reminded not to place a lamp, television set or other heat producing appliance near enough to affect the thermostat by radiant heat.

The low voltage cable from the thermostat is run through the wall to the basement and then to the utility room where it is connected to the appropriate terminals in the unit control box.

When all connections have been completed, the unit is prepared for the cooling check which in this case will be made first. All bearings are lubricated with oil as specified by the unit manufacturer. The fan speed is set at the approximate center of the range obtainable with the adjustable motor pulley. Any setting change will be determined when the heating and cooling tests are made. The fan belt tension is adjusted so the center of the belt can be depressed about 1 in. with the pressure of a finger.

To Start the Cooling Cycle

In the cooling system all refrigerant valves are checked for proper position. The water supply valve is opened. The heat-cool changeover damper is positioned for cooling. All dampers and registers in the duct system are fully opened. The thermostat is set low, and the disconnect switch is closed to start the unit on the cooling cycle.

During the initial operation, preliminary adjustments and checks are made. The water regulating valve is set to give the desired head pressure (or leaving water temperature). With the compressor and fan running, the water flow is stopped to test the high pressure cutout. With the water flow re-established, the fan is stopped to test the low pressure cutout. All other controls (including automatic heating-cooling changeover) are checked out. The air temperature range across the cooling coil is measured as a rough check on unit operation. The refrigerant system is tested for leaks with a halide lamp. It is also inspected for unusual noises and rattles. Panels are checked for tightness. The air duct and distribution systems are checked and adjusted for even temperatures throughout the house.

Checking the Heating Function

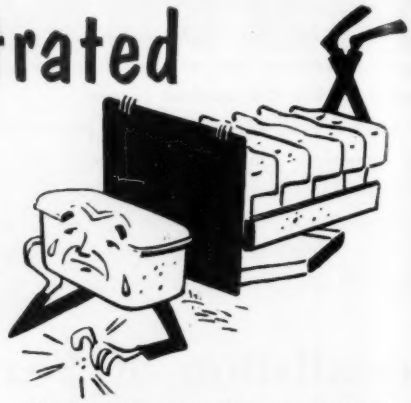
The heating function of the conditioner is checked out with just as much care as was given the cooling function. The oil burner is started in accordance with manufacturer's instructions. After temperatures have stabilized, the fuel rate, air intake and draft regulator are adjusted for maximum CO_2 with the lowest stack temperature with no smoke visible at the chimney.

The fan and limit control in the furnace plenum must then be checked and adjusted. All safety controls on the burner are also checked for proper operation.

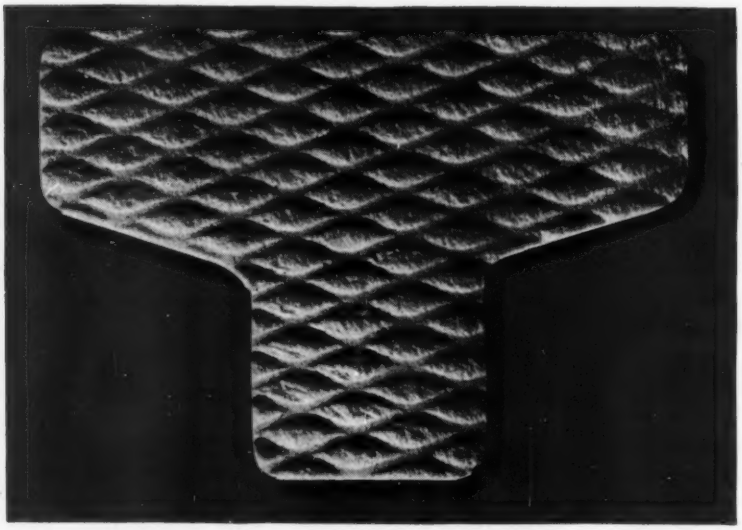
The unit installation is completed by cleaning up the area and the unit itself. The entire year 'round system is gone over with the owner so he understands how to operate it and make any required seasonal adjustments. A set of printed instructions is left with him for future reference. The dealer also explains to the owner the extent of unit warranties and leaves with him the phone number to call for emergency service.

Standardize on Skuttle — The line is complete — Parts are interchangeable

A humidifier is frustrated if it hasn't good evaporating plates



Patented Vapoglas Plates absorb more water • Diffuse more • Last longer without clogging • Standard in Skuttle Humidifiers



Note these test results on evaporating plates

Type Plate	Dry Weight Ounces	Wet Weight Ounces	Gain Dry to Wet*	Open Space In Plate#
Patented Vapoglas	1.5	3.6	140%	83%
Plate B	3.4	4.6	38%	55%
Plate C	1.67	2.61	54%	42%
Plate D	9	11.5	28%	27%

Drop test on concrete floor shows Vapoglas has greatest resistance to breakage.
*Indicates water absorption.
#Indicates resistance to clogging with water chemicals.

No humidifier can be any better than its plates—because the plates are the only elements that can do any humidifying. The rest of the device exists merely for supporting the plates and supplying them with water. Any humidifier is thwarted of its life purpose unless it has good plates.

BEST PLATES — A MUST

Hence it is of first importance that the humidifier you install be equipped with the best in plates—that the plates you use for replacement be the best.

VAPOGLAS — THE BEST

By every test, Patented Vopoglas Plates are the best. They absorb 73% more water, (pound for pound). They have 83% open space (to resist clogging) against 55% for the next best. They are lighter, sturdier. Drop tests show they resist breakage better.

Patented Vapoglas Plates are made of pure glass wool compressed and stabilized under heat.

All Skuttle Humidifiers in which plates are used have Vapoglas plates.

If it's a Skuttle—it's a better Humidifier with better plates.

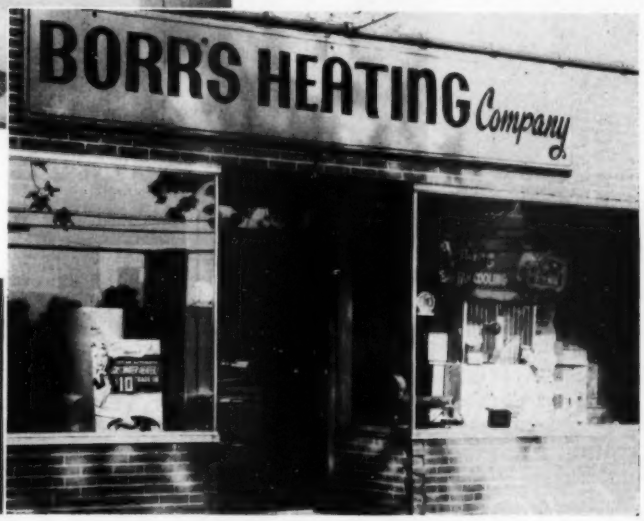
For Any Warm Air Heater There's A Skuttle Humidifier That Does It Better.

6973

Skuttle

MANUFACTURING COMPANY
MILFORD, MICHIGAN

WINDOW FAN DISPLAY amidst heating equipment identifies American Heating Co. as heating-cooling headquarters for apartment dwellers



PROMINENT SPACE at Borr's is devoted to promotion of window fans beginning in early summer

Cooperative Merchandising

Builds Window Fan Market

A test campaign proves the value of cooperation between manufacturer, wholesaler and dealer, and uncovers a profitable market which is a natural for the warm air heating dealer

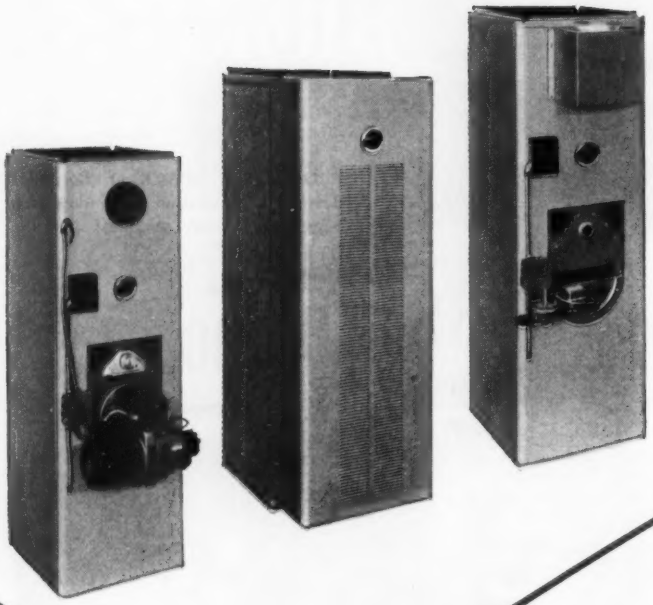
LONG AGO warm air heating dealers discovered that offering merchandise appropriate to the current season is an effective method of attracting customers to their showrooms. With the first warm days of summer, people begin to be concerned with facing the heat and humidity of the approaching days and nights. Many prospects for refrigerated cooling systems are limited in their selection of equipment because of physical problems beyond their control. Apartment dwellers, for example, often do not have the electrical power available in their rented quarters for large, power consuming devices, and even if the electrical energy is available, many landlords will not permit installation of equipment that protrudes beyond the building line.

Apartment dwellers therefore represent a large market potential for a product which is adaptable to locations where refrigerated cooling is restricted. One such product, of course, is the window fan which quietly draws the cool night air into a building, cools the hot walls and discharges the warm air outside.

Aimed at this profitable market and designed to estab-

(This article continued on page 100)

THERE'S A MOR-SUN WARM AIR FURNACE for every home heating requirement . . . the right size . . . the right price . . . for new construction or modernization



NEW "U" SERIES Gas and Oil Highboys. 4 Models. New, improved Heat Exchanger guaranteed for 10 years. Capacities range from 75,000 to 125,000 BTUH Input for gas and 72,800 to 112,000 BTUH Output for oil. Vestibules are optional on this series.

MOR-SUN

FOR '55...

DELUXE JMT SERIES Gas and Oil. 4 Models. New, improved Heat Exchanger guaranteed for 10 years. Capacities from 105,000 to 190,000 BTUH Input for gas and 95,200 to 151,000 BTUH Output for oil. *The finest Automatic Forced Warm Air Furnace available anywhere.*

NEW "C" SERIES Gas and Oil Counterflows. 4 Models. New, improved Heat Exchanger guaranteed for 10 years. Capacities range from 75,000 to 125,000 BTUH Input for gas and 72,800 to 112,000 BTUH Output for oil. Vestibules are optional on this series.

NEW "B" SERIES Gas and Oil Lowboys. 3 Models. New, improved Heat Exchanger guaranteed for 10 years. Capacities from 95,000 to 130,000 BTUH Input for gas and from 84,000 to 112,000 BTUH Output for oil. Vestibules optional.

new models . . . new features . . . a complete line

NEW "H" SERIES Gas and Oil Horizontals. 4 Models. Capacities from 80,000 to 140,000 BTUH Input for gas and 72,800 to 112,000 BTUH Output for oil.

MODEL C-75 WALL FURNACE Gas and Oil. For flat wall or corner installations. Capacities — 75,000 BTUH Input for gas and 57,000 BTUH Output for oil.

GRAVITY SERIES Gas only. 2 Models. Capacities from 80,000 to 110,000 BTUH Input.

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***Mor-Sun Division*, MORRISON STEEL PRODUCTS, Inc.**
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Send us all the facts about Mor-Sun Warm Air Furnaces and Air Conditioners.

Name ..... Title .....
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MOR-SUN PRESSED STEEL FURNACES ®

Mor-Sun Warm Air Furnaces and Air Conditioners are distributed nationally and sold through leading heating equipment dealers everywhere.

Also manufacturers of ROLY-DOOR STEEL GARAGE DOORS and MORRISON SERVICE BODIES.

Cooperative Efforts Up Window Fan Sales

(*Continued from page 97*)

lish the warm air heating dealer in the public eye as the logical source for this type of equipment, a cooperative merchandising plan involving dealer, wholesaler and manufacturer was undertaken in western Michigan last summer. Principals in the test campaign in addition to the manufacturer were Bennett Heating Equipment Co. and 161 dealers.

Well-Rounded Program

The merchandising program consisted of direct mail pieces, local newspaper ads, window displays, TV and radio programs and three dimensional counter displays. Special instructions on how to conduct and close a window fan sale were provided by the wholesaler's representatives. Use of the three-dimensional easel presentation was emphasized, as an important part of the final sales step between distributor and dealer. The easel contained a number of eye appealing 3-D cards which illustrated how movement of a large volume of cool night air through the apartment or house by a quiet fan reduced the residual heat left in the walls during the day and made the building more comfortable during the next day's heat.

Warm air heating dealers cooperating in the Michigan campaign exceeded usual merchandising procedures, undertaking to tell their prospects more about window fans. One dealer — Borr's Heating Co. of Kalamazoo — used a 1904 model Brush automobile with a window fan mounted on the back of the chassis as an eye catcher. The arresting display was used both in a parade and for several weeks thereafter in making deliveries.

Another dealer — American Heating Co., Grand Rapids — made a trial installation offer which proved profitable since none of the customers who accepted the trial installation returned the fan. Mr. Borr, the Kalamazoo dealer, plans to stay in touch with a list of about 700 LP gas customers by telling them about the availability of fans at his showroom. He also expects to develop the LP gas customers into heating service customers.

Dealers See More Fan Sales in '55

In a survey conducted by American Artisan in December 1954, the 161 dealers were asked about their experience in merchandising window fans during the past summer. The response indicated that the dealers expected to sell as many or more ventilating fans in 1955 as they had sold during 1954. Some of those reporting were Nosal Heating Co., Lansing, which sold eight fans in 1954 and expects to sell 10 more in 1955; Harris Heating Co., Coldwater, which sold five fans in 1954 and expects to sell 20 more this year; and Borr's Heating Co., Kalamazoo, which sold eight in 1954 and anticipates selling many more in 1955.

These estimates may appear rather conservative until one considers that the retail sale was about $85 or more per fan with a dealer margin between $28.30 and $35.92 per fan. The extra margin is realized when six or more fans are purchased on a quantity discount and an $8.75 timer is added to the sale.

Some of the other questions asked were:

Have you found that having window fans available for customers makes it possible to obtain leads for other merchandise handled?

To this question, 90 percent of the respondents answered *Yes.*

Based on your 1954 sales, would you recommend window fans to other dealers as a good summer item?

Here again, 90 percent answered *Yes.*

Did you find that the sales promotion of Bennett Heating Equipment Co. reached people that had not heard about your company before?

Here 40 percent answered *Yes,* 40 percent, *No,* and 20 percent did not answer.

Do you believe that cooperative advertising is an effective sales tool that all dealers can use to advantage?

In this case every dealer returning the inquiry answered affirmatively.

Test Proves Value of Cooperative Plans

It should be pointed out that only warm air heating and residential air conditioning dealers and sheet metal contractors were included in the survey — no appliance or electrical contracting firms were asked to participate in the effort to determine if seasonal side lines were worthwhile for a group of dealers handling warm air heating and residential air conditioning equipment. From the tabulated results of this survey, it would appear that the whole industry profits by cooperative merchandising efforts of manufacturer, wholesaler and dealer.

Most sales campaigns are successful when plans are made far enough in advance to coordinate the combined efforts of all participants. Early spring has proven the best time to start dressing the show window with ventilating fans and sending direct mail pieces to the prospects, according to H. J. Borr of Kalamazoo.

[Photos courtesy of Viking Air Conditioning Div., National Radiator Co.]

Peerless Blowers Designed For Your Needs

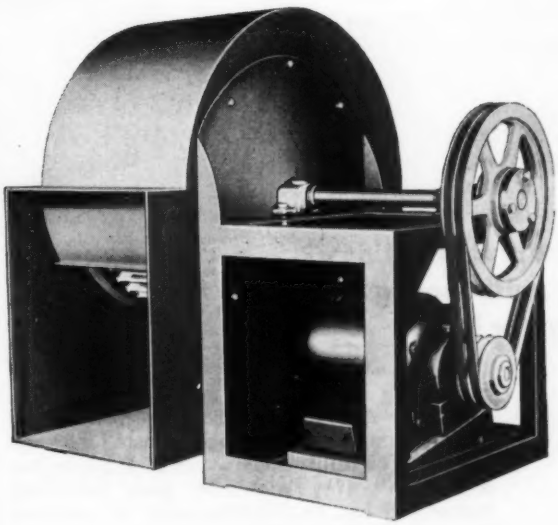
BACKWARD CURVE BLOWER

Price ✓
Delivery ✓
Engineering ✓
Quality ✓

Join the swing to Peerless—the complete line of fans and blowers that meets today's big construction demands. Dealers, distributors and contractors choose Peerless because Peerless gives them more, including free engineering help on tough, middle-size jobs.

Peerless manufactures all components in its products, including the motors. You get the advantages of undivided responsibility; fans and blowers that meet all NAFM standards; prices that are set and held competitively; and, top-flight trouble-free performance that boosts profits by eliminating costly call backs. Because Peerless has control of the entire process, you can get immediate delivery on any item in the big Peerless line.

Check and see; compare and prove that you buy best, sell best, install best and are served best when you deal with the fan and blower manufacturer that offers you most—Peerless.

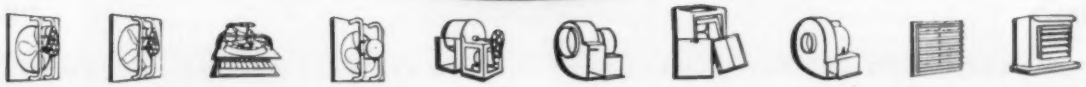


BELT DRIVE UTILITY BLOWER

THE PEERLESS ELECTRIC CO.

Peerless Electric

FAN AND BLOWER DIVISION
1405 WEST MARKET ST. • WARREN, OHIO



Mueller Climatrol announces a new Combination Year-round Air Conditioner

Lets you cash in on the growing demand for all-season comfort ... *two ways:*

1. *You can sell it as is — as a combination heating and cooling unit.*

2. *You can sell it as a furnace alone. And since it comes with an integral cooling casing, you have a prospect for a refrigeration assembly later on.*

Gas or Oil Heating ... with cooling now or later

The Type 128 (gas) — 228 (oil) furnace is a prewired unit compact enough to install in closet, basement, or utility room — 59¾" high (to top of casing) x 47½" wide x 36" deep (including burner). It has 100,000-Btu input. All controls, flue, etc. are at front for easy access.

It's an attractive, quality-built unit with the kind of advanced features you expect from Mueller Climatrol — such as a heavy, welded-steel heat exchanger and a large blower. The oil type 228 can easily be converted to gas.

Although it has an integral cooling casing, the Type 128-228 costs less than many standard furnaces. A vestibule for both oil and gas is available as optional equipment.

The Type 928 cooling unit is a 2- or 3-hp refrigeration assembly mounted on a frame that slips easily into the cooling casing provided with the Type 128-228 heating unit.

The Type 928 operates on single or 3-phase current. It uses the same blower as the furnace. A backdraft damper is furnished as standard equipment with the furnace.

There's no doubt about it — this Mueller Climatrol combination unit is one of this year's best potential money-makers. And right now's the time to make the most of it. Write us today for details: Mueller Climatrol, Dept. 135, 2030 W. Oklahoma Avenue, Milwaukee 15. Wisconsin.

B-182

98th Anniversary

NEARLY 100 YEARS OF MANUFACTURING QUALITY COMFORT EQUIPMENT

SOMEWHAT LARGER but at the same location since 1914, National Cornice Works is still a "sheet metal shop"

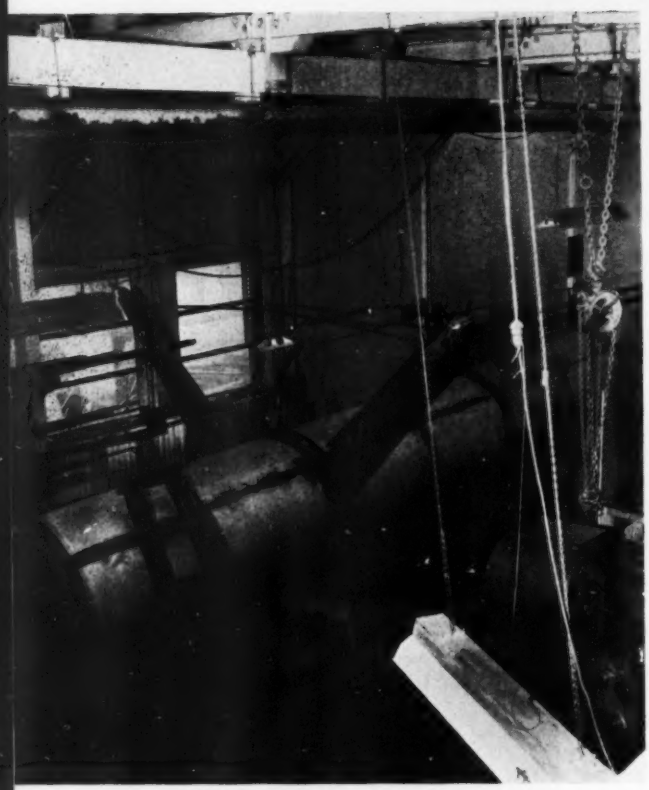
Sheet Metal Contractor Builds Prestige on Specialty Lines

By Robert F. Welch

Steady growth in business and reputation is the result of an early decision to avoid the peaks and valleys of the construction business by manufacturing proprietary products for other industries

A REPUTATION BUILT largely on the fabrication and distribution of specialty items has established National Cornice Works as one of the outstanding sheet metal contracting organizations on the west coast. Located at the same address in Los Angeles since 1914, the company has experienced constant expansion and increased prestige in other industries, still maintaining its identity as a sheet metal contracting firm which is known for its fine architectural and industrial work.

"I resolved early to avoid the 'feast or famine' aspects of the building industry," explains owner W. H. C. Ness who has been a sheet metal contractor 43 years. "By manufacturing proprietary products for other industries, a sheet metal contractor isn't tied to the violent fluctuations characteristic of construction activity. We are able



HUGE TEST BLOWER is used to gather data on the company's own products as well as those of other industries

SMALL MACHINES are centralized in one portion of the shop

to maintain a relatively constant volume because of diversification. That means high employee productivity, since skilled men are assured steady employment."

One of the first developments in the diversification program was establishment of a wholly owned subsidiary in 1919 the purpose of which was to manufacture ventilating apparatus. Its catalogue includes ventilating equipment for all types of industrial and commercial purposes.

Compilation of the catalogue is a tremendous undertaking in itself because of the exhaustive technical data which must be supplied for each fan model. The fan company has four engineers on its staff whose duty it is to make certain that the equipment does the job expected. Over $25,000 has been expended for engineering work alone on the new catalogue which will soon be issued.

Testing Equipment Called For

When he launched the fan company, Mr. Ness also acquired equipment to do his own testing. He now has large test blowers and measuring devices which give him all the information necessary for product development. Recognition by the National Association of Fan Manufacturers testifies to the authenticity of his findings and eliminates any need for the services of outside testing laboratories. In fact, the company does a great deal of work for other firms who are not similarly equipped.

A natural corollary of fan manufacturing is the field of dust and fume collecting — a subject of great importance to all residents of Los Angeles. *Smog* has received more unfavorable publicity and caused more ruffled tempers than any other single subject in the southern California city and its neighbors.

Pioneers Smog Control Efforts

Mr. Ness has been a member of the Atmospheric Purification Committee of the Los Angeles Chamber of Commerce ever since the group was organized. Several years ago he installed one of the first smog control systems in Los Angeles.

Pilot equipment enables the company to obtain concentration samplings which serve as a guide in establishing engineering requirements. A determination of micron sizes and gas temperatures is necessary for proper design. From seven to ten stages of control are provided, with enough spray to handle the maximum output of contaminents.

Both the fan company and the dust and fume collecting operations are local in nature. Another related phase of the business is the manufacture of metal flashing and trim. The firm supplies nearly half of local requirements for metal trim, used primarily as plaster retainers in all types of buildings.

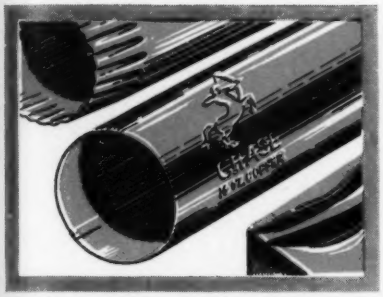
Another fabricating division produces commercial food service equipment. Many of the items in this line are distributed nationally under different brand names

(*This article continued on page* 110)

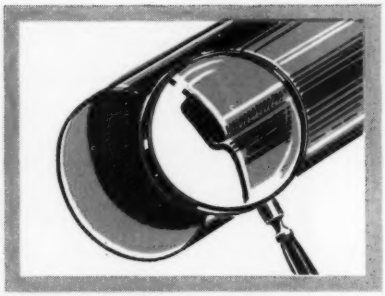
Chase®

gives you 7 reasons why copper means a better home!

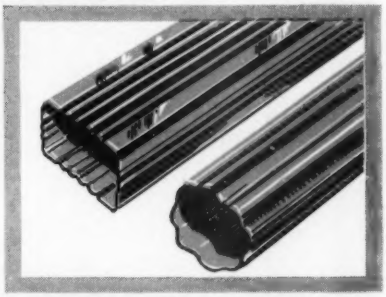
It won't rust and resists corrosion—**Copper's** resistance to the elements is traditional—even in areas where atmospheric conditions destroy other metals. Its performance is proved over centuries of experience.



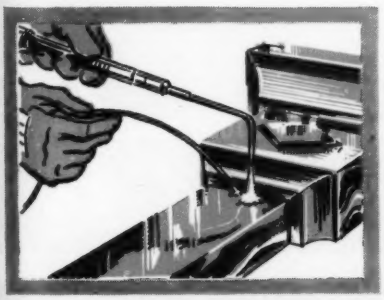
It's full weight—Look for the die-stamped Chase Trade Mark and Weight Stamp—your assurance that Chase **Copper** Roofing Products have stability and permanence.



Seams are adequate—Chase **Copper** Leaders are formed from full-width strips, to assure strong, expansion-proof seams.

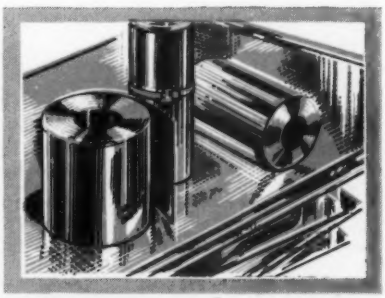


Corrugations are deep and generous—Chase **Copper** Downspouts have full-depth corrugations, ample for temperature ranges in *any* climate.



It can be soldered . . . with ease and economy—Long-lasting, water-tight joints are assured when standard soldering techniques are applied to Chase **Copper** Roofing Products.

It's architecturally harmonious—Modern or traditional design both benefit from **Copper's** rich appearance—a metal protected and beautified by nature itself.



It's economical—The ratio of *first-cost* to *years of service* is at a bare minimum, when **Copper** is used. And, the relationship of copper to overall building costs is as reasonable as it ever was in the past.

Chase®

BRASS & COPPER CO.

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

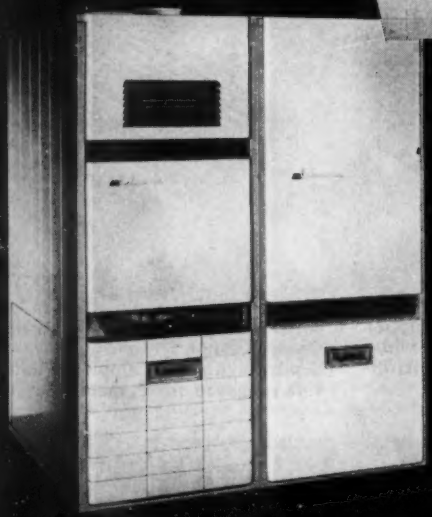
For maximum life and performance, install Chase full weight copper leaders, gutters and roofing accessories.

The Nation's Headquarters for Brass & Copper

Albany†	Chicago	Detroit	Los Angeles	New York	St. Louis
Atlanta	Cincinnati	Grand Rapids†	Milwaukee	Philadelphia	San Francisco
Baltimore	Cleveland	Houston	Minneapolis	Pittsburgh	Seattle
Boston	Dallas	Indianapolis	Newark	Providence	Waterbury
Charlotte†	Denver	Kansas City, Mo.	New Orleans	Rochester†	(†sales office only)

Count on Coleman for home heating and air-conditioning to fit any home, any climate, any budget!

New features Sell the Bigger 1955



Coleman

with exclusive blenders that give home comfort never before possible

It's the ONLY system completely pre-engineered from furnace burner to outlet grille. Exclusive "blenders" replace registers, *blend* hot furnace air with room air to maintain even temperatures floor-to-ceiling and wall-to-wall. 3½-inch round ducts fit between studs—easy to install—eliminate costly cutting—a real sales feature in new homes or remodeling.

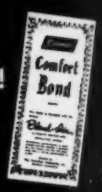
Blend-Air Furnaces—Any Installation

19 models of Blend-Air Furnaces for installation in alcove, closet, utility room, basement, attic or underfloor crawlspace. Compact models to fit any home.

Blend-Air Cooling Doubles Your Sales Prospects: 26 models for new home or old. Savings on water and electricity costs proved in the Coleman Home, NAHB Air Conditioned Village, Austin, Tex.

You Can GUARANTEE comfort with $1000 Bond!

Only Blend-Air gives your customers such comfort—so only Coleman backs you with $1000 Comfort Bond!



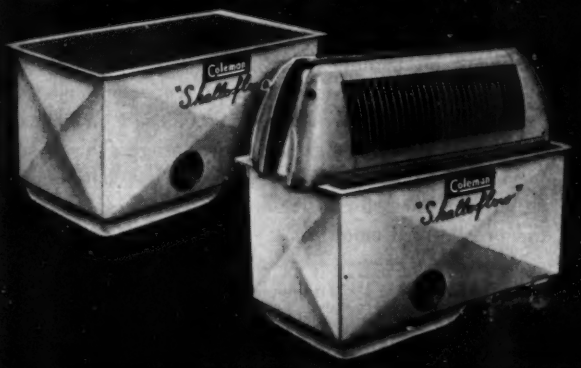
Coleman Wall Furnaces look handsome as a wall decoration—yet give your customers "central heating" performance! Coleman's "Economizer" grille and Directionair blower (optional) Super-Circulate warmth to farthest corners. Easy to install in single-stud space without costly alterations. That's why this furnace is so easy to sell!

THREE big extras sell this water heater *FAST!*

1. Coleman's solid rock lining can't rust!
2. "Jet recovery" action gives plenty of hot water, always on tap!
3. 10-year warranty backed by EXCLUSIVE $500 BOND!

Coleman line faster than ever!

Your customers get a "wall-to-wall" carpet of comfort with Coleman oil or gas space heaters! Only Coleman's exclusive "Super-Circulation" makes it possible. Use the Coleman Super-Circulation demonstrator to prove the difference! Other Coleman "plus" features: new-handsome console cabinets to please the housewife, in a choice of Golden-Glow or shadowed mahogany finishes. New interchangeable Directionair Blowers give "big furnace" comfort. Big fuel savings from exclusive Coleman burners! Sizes to heat one room or entire home!



Coleman Floor Furnaces make any home easy to heat! Exclusive design re-heats and recirculates air 3 to 5 times an hour, re-heats floor level air before it can get cold! Flat register or dual wall models.

Coleman HELPS You SELL

1. NATIONAL ADVERTISING!

Big full page ads in "LIFE" and "Saturday Evening Post," "Better Homes and Gardens" and "American Home" pre-sell your customers on the features of Coleman heating and air conditioning. Take advantage of this powerful advertising program!

2. Biggest PROMOTION PLAN

Coleman offers you a complete assortment of broadsides, demonstration displays, product films in color, banners, envelope stuffers—plus cooperative-advertising plans and promotions to builders. Tie in for extra sales!

Coleman®

Since 1900—makers of the Famous Coleman Lamps, Lanterns, Camp Stoves, and Home Heating and Air Conditioning.

THE COLEMAN COMPANY, INC., WICHITA 1, KANSAS

GAS • OIL • LP-GAS

THE COLEMAN COMPANY, INC., WICHITA 1, KANSAS, DEPT. AA-351

Please send me complete information on your full line of heating, air conditioning and water heating equipment — plus a description of sales helps available to me as a dealer. Have your distributor's salesman call.

NAME_____

FIRM NAME_____

ADDRESS_____

TOWN_____ ZONE____ STATE_____

Contractor Expands With Specialty Lines

(*Continued from page* 106)

DISPLAY ROOM for food service equipment is responsible for many sales

which distinguish quality equipment utilizing fine materials and workmanship from equipment which is sturdy and serviceable, but priced to satisfy those who are more interested in economy than in top quality.

Comparison Provides Bigger Sales

There's an interesting sidelight to this comparison between the two types of equipment. They are both displayed in a second floor showroom at the plant, where dealers may bring their customers. According to Mr. Ness, most buyers are converted to the higher quality product when they see the two together and can make comparisons. He also points out that it's much easier to do a good selling job when the customers see actual merchandise rather than catalogue pictures.

One of the most effective displays is a commercial dishwasher which has glass walls and a light at the bottom to illuminate the interior. When it is connected for demonstration colored ping-pong balls show the machine's efficient cleansing action. From 80 to 100 dishwashers in 28 gas and electric heated models represent the average inventory. Total inventory in the division which produces the finer quality equipment amounts to approximately $150,000.

Food Carts Find Eager Market

About two years ago a portable food cart was introduced and has since gained great popularity with hotels, hospitals, industrial plants and schools throughout the country. Insulated double walls and partitions keep food hot for long periods. Inside temperature reportedly will not drop 5 deg in an hour.

School systems with central kitchen facilities are especially good customers for portable carts. Food can be prepared centrally and served hot to classes some distance away. In primary grades, 300 meals can be transported. For secondary grades carts will accommodate about 250 meals, or 150 to 200 meals in industrial plants. The meals are complete with soup, vegetables, entree and salad. Banquet carts for use in hotels are equipped with open shelving instead of spring-closure doors.

Besides dishwashers and carts, many other products such as dish baskets, glass washing baskets and butter melting trays are manufactured. One innovation is a roll or pie warmer in which infra-red rays heat sweet rolls and pastry in slightly over one minute. There are about 700 dealers distributing food service equipment, all of whom are chosen on a selective basis to insure best results in the field.

Business Volume Requires Expansion

National Cornice Works also does a variety of precision work for manufacturers in the fields of explosives, electronics and aircraft. The wide scope of goods and services offered makes the plant's 90,000 sq ft inadequate, and adjacent property is used for storage. There's also a complete carpenter shop for crating merchandise and a literature room for assembling and mailing catalogues and promotional material.

Mr. Ness, who now hires about 125 employees, came to Los Angeles in 1911 when he was employed as a sheet metal worker for the California Cornice Works at $4 per day. Six months later at the age of 24, he bought the White Cornice Works which was the forerunner of the modern organization.

Owner Fights for Education Opportunities

In the days when 50 cents an hour was considered a fair wage, apprentices had to learn their skills on the job. Mr. Ness attended night classes to prepare himself for running a business. Now he is helping to provide educational facilities for mechanics as a member of the advisory board of the Los Angeles Technical College and of the state educational advisory committee for the sheet metal trade, California Department of Education.

He has also devoted a great deal of time to trade association work. For seven years he was head of the Sheet Metal Contractors Association of Southern California, and has a long history of service on the board of the Sheet Metal Contractors National Association. Another local honor is his election this year as secretary of the Los Angeles Home Show, after serving on the board of directors and executive committee for ten years.

Many outstanding showplaces demonstrate the work he performs in architectural sheet metal. One is Grauman's Chinese Theatre in Hollywood; another is Griffith Observatory, where the metal domes and obelisks have been seen by millions of people.

So in Demand*

AND PEERLESS HAS IT

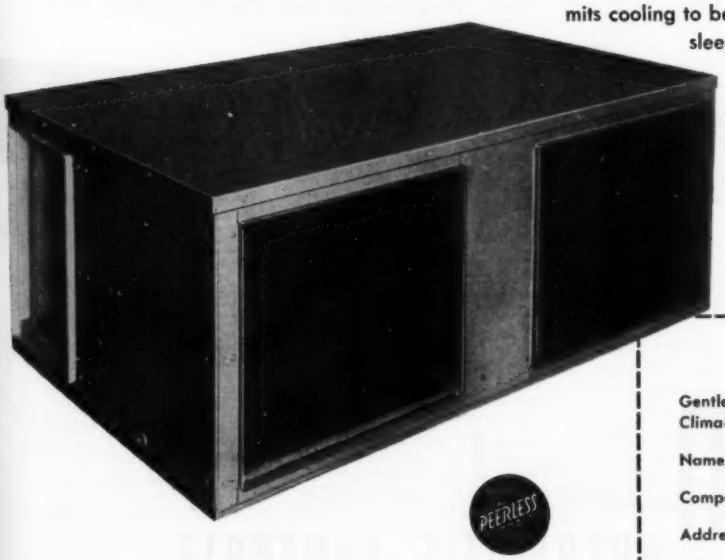
Complete home air conditioning in window unit price range

PEERLESS

Clima-Twin-Zone AIR CONDITIONER

Now . . . the Clima-Twin-Zone takes air conditioning out of the luxury class, puts it in the mass market, where demand is growing every day. Air-cooled, compactly-built, this unit can be installed in new or existing housing . . . either as an independent system or tied in with any duct heating plant. A living-room damper control permits cooling to be directed to the living area by day, the sleeping area by night. On all but extremely warm and humid days, a Dual-Zone setting cools the whole house.

Your retail price will be the same or even less than window-installed units which do not have the capacity or air delivery efficiency of the Clima-Twin-Zone.



PEERLESS AA

Peerless Furnace & Foundry, Inc.
1853 Ludlow Ave., Indianapolis 7, Indiana

Gentlemen: Please rush me full information on your new Clima-Twin-Zone air conditioner.

Name_____

Company_____

Address_____

City_____ State_____

NEW... it's designed to

HEATING-C
THERMOSTAT by

the smart, modern thermostat that ends Hot-n-Cold Living!

New . . . all new . . . the Penn Series 880 Heating and Cooling Thermostat is the result of more than a year's research and testing. It embodies all of Penn's many years of experience in designing and building BOTH heating and cooling controls for *leading* manufacturers of heating and refrigeration equipment.

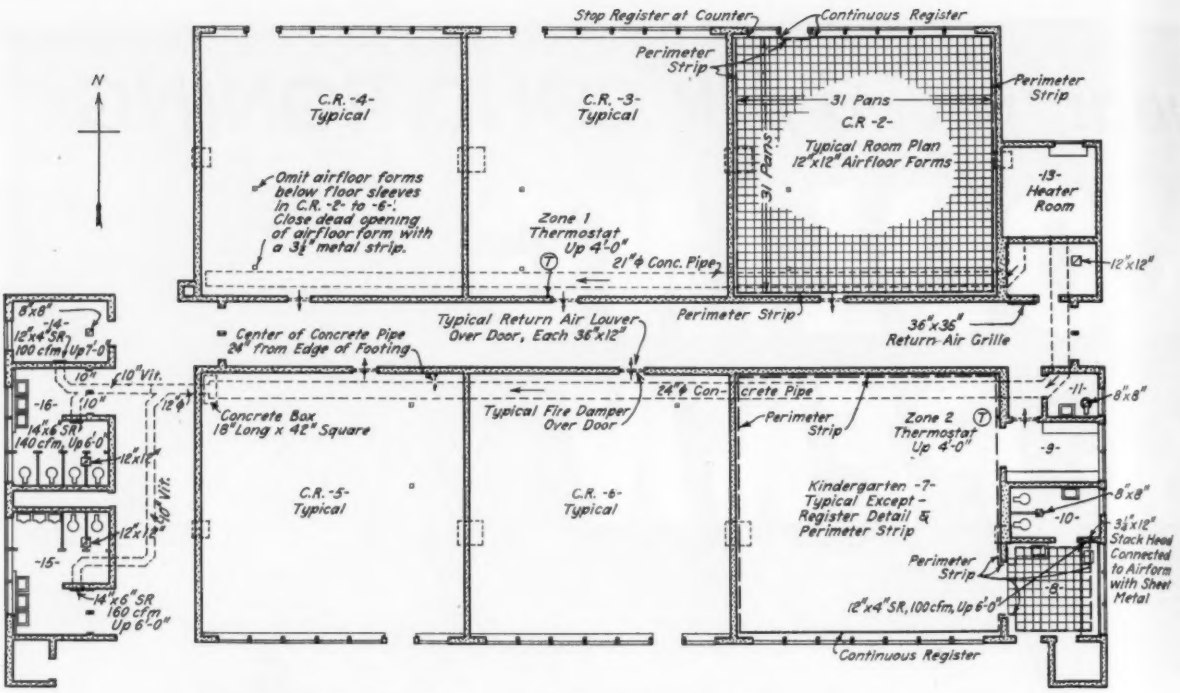
Small, compact with modern horizontal lines, the Series 880 incorporates today's greatest features in heating and cooling thermostats. It has the time-tested snap-acting contact structure that is still the very best for sturdiness and long-life dependable operation. Then, there is the Penn-made magic of *heat anticipation* and *cold anticipation* that assure *closer temperature* and *humidity regulation,* the year 'round, to end Hot-n-Cold Living! And, there are many more . . . just look at the features listed on the opposite page.

Don't settle for less when Penn costs no more! Be sure the packaged air conditioning you sell and install is fully equipped with Penn automatic controls. **Penn Controls, Inc., Goshen, Indiana.**

Designed for comfortable living

PENN AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, GAS APPLIANCES, PUMPS, AIR COMPRESSORS, ENGINES



1 CENTRAL HEATER ROOM, upper right, serves all six classrooms. From two concrete main supply ducts air passes through floor cavities to outside continuous registers

Warm Air Floor Panel–Convection Combined To Heat New School

• Students are not the only ones who face problems and new ideas in the modern school. The ingenuity of engineers and contractors also is challenged. Evidence that they are keeping pace in meeting the changing requirements of today's educational plants is reflected in this report on how a problem was solved by a heating system utilizing warm air to heat a concrete slab floor and to provide convection heat as well as ventilation from continuous baseboard registers.

By G. L. Gendler

Consulting Engineer;
Lecturer in Architectural Mechanics
University of California

A WARM AIR FLOOR PANEL heating system installed in the Alta Heights school, Napa, Calif. provides the advantages of a comfortably warm slab and outdoor air for ventilation. The system was installed without increasing the total cost of construction.

The floor plan of six classrooms, three on either side of an enclosed corridor with a central heater room at one end, is shown in Fig. 1. Two counterflow furnaces are installed on concrete discharge plenum chambers. Supply and return air are controlled at the blower intake by motorized

Halstead & Mitchell

for LONG LIFE PROTECTION

COOLING TOWERS

with the exclusive

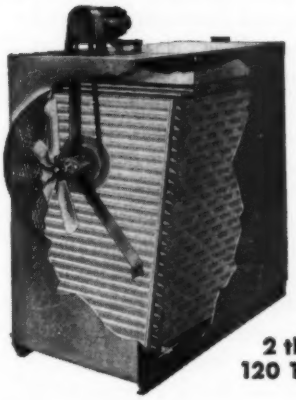
20-Year Guarantee!

on the wetted deck surface against rotting or fungus attack

YOU ARE GUARDED WHEN YOU CHOOSE A HALSTEAD & MITCHELL RESIDENTIAL OR COMMERCIAL TOWER

Only Halstead & Mitchell can offer a 20-Year Guarantee on the wetted deck surface against rotting or fungus attack because only Halstead & Mitchell creosotes cooling tower wood. No other material, subject to deteriorating or rusting, can be so guaranteed.

Stainless steel fans, sheet steel cabinets hydraulically painted with vinsynite, vinyl zinc and chlorinated rubber . . . add to this protection for the longest life. There's no extra cost for these extra protections . . . just extra long time benefits on the job.



2 thru 120 TONS

CONDENSERS

with economical

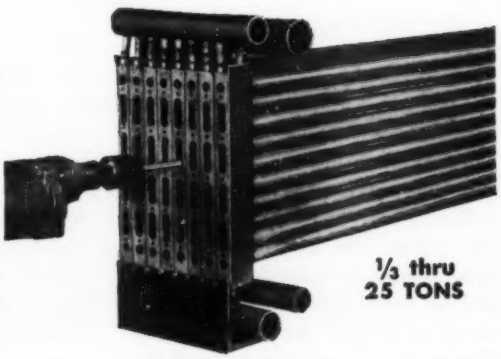
Lifetime Cleanability

for always-new efficiency

The cooling tower you select works with a condenser, and here again you are guarded by Halstead & Mitchell.

CLEANABILITY in a water-cooled condenser costs no more, but troubles from poor water conditions vanish. Heat transfer efficiency is maintained at new unit levels for life, for a simple mechanical cleaning tool restores heat transfer surfaces in minutes.

Regardless of whose condensing unit you buy, do what almost all leading manufacturers have done — specify CLEANABILITY. It's your most important protection . . . why settle for less?



⅓ thru 25 TONS

AT LEADING HEATING AND REFRIGERATION WHOLESALERS EVERYWHERE

Write for Detailed Specifications

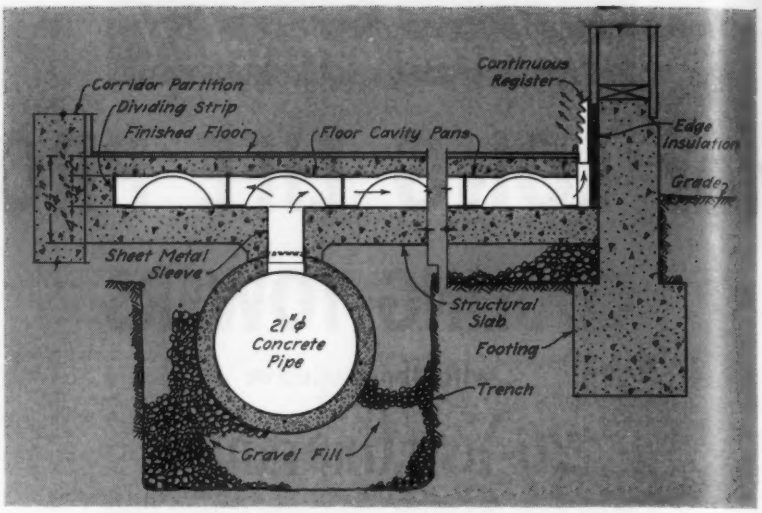
HM Halstead & Mitchell

BESSEMER BUILDING • PITTSBURGH 22, PA.

mixing dampers. The supply air passes from the plenum of each furnace through a concrete pipe, which serves as a warm air supply duct to the three-classroom zone. Individual room thermostats were not deemed necessary for rooms that have the same exposure and approximately equal internal heat loads. The concrete supply pipes are tongue-and-groove pipe, and are not reinforced. They are in 3 ft sections.

The warm air from the duct passes up into the cavity floor through sheet metal sleeves (Fig. 2). These holes are 3 ft on center at the joint of each pipe section. The air then passes through the warm air cavities from the inside classroom wall, through the floor to the outside wall, warming the floor uniformly as it passes along and then passes up through a continuous register at the outside wall. The air enters the room at low velocity and counteracts the cold wall effect and downdrafts at the outside window walls. The air is then returned to the central corridor through louvers above the doors in each classroom and into a single return air intake that is adjacent to the heater room.

The air supply to the kindergarten passes through an air slot behind the cabinets to the same type of continuous register as used at the baseboard. These special registers have interlocking blades and are vision-proof to prevent the students from poking pencils and other objects into the outlets. The air supply to the toilet spaces is extended from the end of the concrete pipe into sheet metal stacks and highwall registers. The air is not recirculated from the toilets, which are, in effect, separate from the classroom wing.



2 TYPICAL FLOOR SECTION shows metal sleeve, which delivers air from supply pipe to floor cavity, and other details. Mean floor temperature is 75 F

How System Was Installed

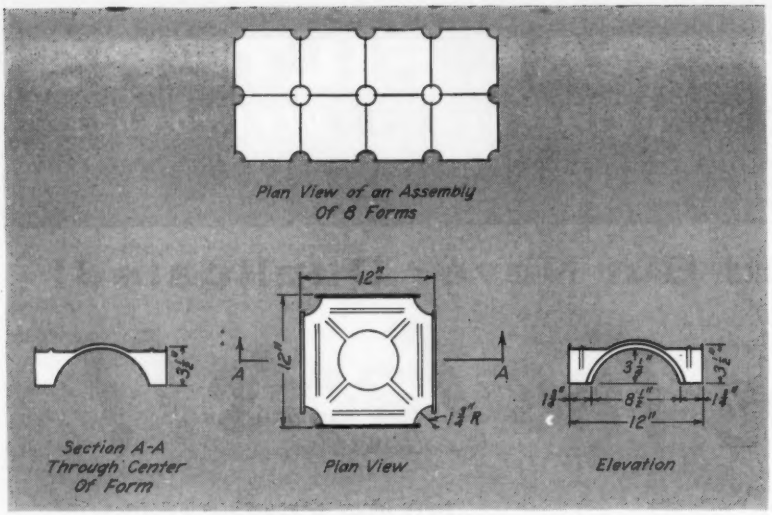
A novel feature of the cavity floor system is the fact that the entire floor structure itself is an integral part of the heating system which conserves space and reduces construction costs. Space conservation is two-fold: (1) Furred-in overhead ductwork in virtually eliminated. Only short return and outdoor air sheet metal duct connections are required at the furnace room. (2) Heater room space is kept to a minimum by the use of counterflow furnaces.

The system incorporates prefabricated sheet metal forms installed in a double deck floor construction consisting of two relatively thin, monolithic concrete slabs. The slabs are separated by means of a mushroom column formation within the entire floor area that creates a catacombed air space through which warm or tempered air can be circulated. The forms are specially designed, 26 gage metal stampings, 12 in. square and 3¼ in. high. The top of the form is slightly domed for additional rigidity, and the matching faces are flanged with small ears, which are bent over a metal clip for holding the forms together to form a tight-fitting deck over the structural slab.

A 4 in. structural reinforced slab was laid over the rock fill and rough-finished. Reinforcement was placed in the lower slab only, since tensile stress was caused by a positive bending movement. The plugs were removed from the sleeves in the supply ducts and the steel cavity forms were laid starting at the outside wall. Forms were shop-assembled in units of eight and delivered to the site, and these assemblies were then locked together in position on the lower slab. (Fig. 3). A 3½ in. high × 26 gage perimeter strip closes the ends of the forms on all sides except at the register.

The direction of air flow through the forms is determined in the design, so that the warmest air will travel to the zones of the greatest heat loss. The direction of the air flow can be permanently set by installing dividing strips between the stampings before the top layer of concrete is poured.

The finished layer of concrete was poured over the forms with a minimum thickness of 1½ in. above the arch crown. This results in a self-supporting upper slab forming arches and groins. The units are 12 in. on centers in rows and are at right angles to each other. The center point between any four units makes a groin. About 90 percent of the floor area between slabs is air space, which stops capillary action of moisture through the slab. Heat loss through the edge of the slab was minimized by installing ⅝ in. edge insulation behind the registers against the outside wall. Classroom floors are finished with asphalt tile.



3 STEEL FORMS, 12 in. square and shop-assembled in units of eight, are locked together in position on the lower slab. Upper slab is self-supporting by means of arches and groins

Controls Are Automatic, Zoned

The system is fully automatic and is controlled by zone thermostats, with summer switches for independent blower operation for ventilation and cooling with outdoor air during mild weather—60 F or above.

The outdoor air dampers are positioned to supply a minimum of 10 cfm of outside air per student at all times for the control of odors and a comfortable learning atmosphere. The outdoor air damper will be full open when the return air is at 70 F or above. Each of the two-zone thermostats cycles the gas valve on the furnace to maintain the room temperature. The control point of the room thermostat is reset by an outdoor temperature controller. A time switch provides program control to the supply fans so that the system will operate as required during the school day. The outdoor air and return air passes through cleanable filters. The furnace is equipped with a manual bypass damper to handle the required air quantities and, at the same time, produce a minimum temperature rise of 70 F through the combustion chamber.

Dampers are not required in the supply system, since the ducts act as a static pressure plenum chamber. In the event that any air balancing should become necessary, the openings from the slab into the registers can easily be adjusted.

Cost of installation of this type of system is subject to numerous variables depending upon the location, overall project size, type of construction, type of heating medium and the competition at the time of bidding. The cost of this installation was approximately the same as that of a quality hot water floor panel system with individual room control. The heating contract cost included the forms, registers, heating equipment and controls, perimeter insulation, trenching for concrete ducts and all under-floor concrete work except the two slabs.

Proper air delivery is the key factor in obtaining maximum uniformity in floor and room air temperatures. The frequent air changes have the secondary effect of providing a comfortable classroom atmosphere. The air should be returned either at the high wall or ceiling in order to maintain uniform floor-to-ceiling temperatures. Room air temperature lag is prevented by the use of the warm air panel and convection split system and the inherent ability of heating by convection to follow the need for heat. The frequent air change results in a fast pick-up or reduction of room temperature as required.

The over-riding effect which may be encountered when the outdoor temperature rises rapidly, as it does in many California communities, together with the sun load and lighting loads, is virtually eliminated in the warm air panel system by continuous blower operation in conjunction with automatic outdoor air damper control.

How System Operates

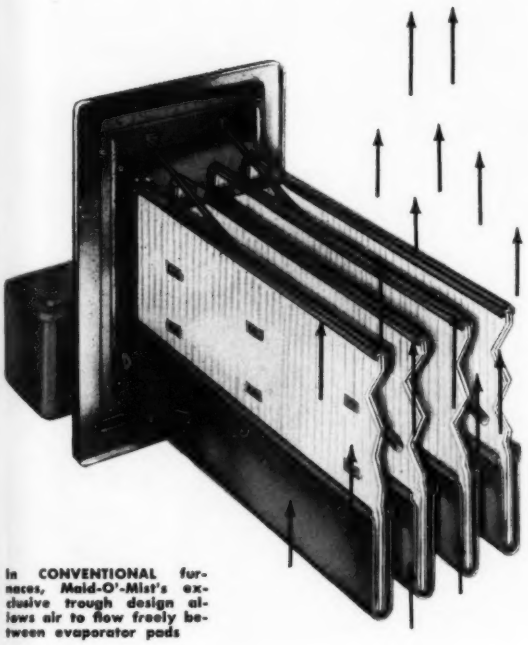
The mean floor temperature is maintained at approximately 75 F at design conditions. It is estimated that 30 to 40 percent of the heating is accomplished by radiation and convection from the floor slab and 60 to 70 percent by convection from the air entering the room from the registers.

The design required approximately six air changes per hr, with a discharge temperature at the furnace of 106 F. The maximum temperature of the air introduced at the registers is approximately 85 F. Inasmuch as the air entering the room at the register outlets is approximately equal to or lower than skin temperature, it will feel comfortable to the skin. The supply air is introduced in a vertical plane from the register and blankets the cold exterior wall and glass areas with tempered air.

The air handling capacity of the floor far exceeds normal requirements. With all the air supplied from the inside wall of the classroom, 1000 cfm can be passed through the floor at 200 fpm at 0.01 in. of water column static pressure. Studies indicate that friction losses through the cavity floor are no greater than would exist in normal ductwork of equal area.

There are many variations to the above system that are possible. For example, a furnace and supply duct could be installed for each classroom for individual room control. The individual furnaces can be installed in a common heater room or in a closet installation adjacent to each of the classrooms.

Conventional or Counter Flow!



In CONVENTIONAL furnaces, Maid-O'-Mist's exclusive trough design allows air to flow freely between evaporator pads

MAID-O'-MIST

CONVECTOR

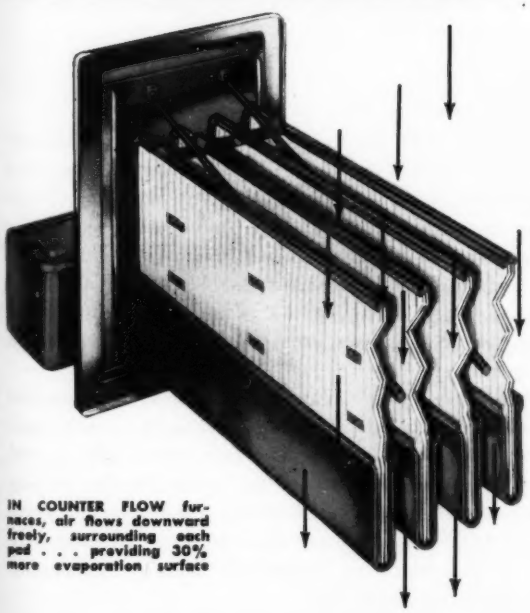
HUMIDIFIER

is the ONLY standard unit that fits BOTH TYPES of warm air furnaces

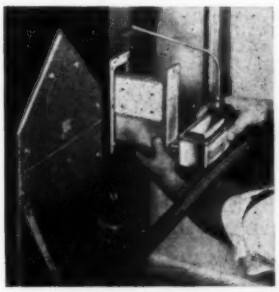
This versatile convector humidifier is ideal for the small plenums of all modern warm air furnaces . . . conventional, counter flow and year-around air-conditioning units.

Unlike ordinary warm air furnace humidifiers, the Maid-O'-Mist has no flat bottom to block the flow of warm air. Maid-O'-Mist's exclusive design—individual ⅜" copper water troughs spaced 1" apart—allows unrestricted air flow between patented evaporator pads . . . provides 30% more evaporating surface necessary in short-cycle modern heating.

Maid-O'-Mist's design makes installation easy. There's no fitting or fastening to the back of the plenum. The unit is entirely supported by the flange frame in front.



IN COUNTER FLOW furnaces, air flows downward freely, surrounding each pad . . . providing 30% more evaporation surface



FOR COUNTER FLOW WARM AIR FURNACES

Maid-O'-Mist, because of its narrow trough design, can be installed on either side of counter flow furnaces having a minimum air passage of 3 inches.

FOR CONVENTIONAL WARM AIR FURNACES

Installation is fast and easy. Just cut opening in plenum and make water connections. 13 sizes available with evaporation capacities of 1 to 10 gals. per day.

60% LESS AIR RESTRICTION IN PLENUM

30% MORE EVAPORATION AREA

50% LESS INSTALLATION TIME

Get full information on these competitively-priced units from your jobber or write for Bulletin 701-B

MAID-O'-MIST Inc.
HEATING SPECIALTIES

AUTOMATIC HUMIDIFIERS . . . . . AUTO-VENTS
WATER LINE CONTROLS . HEATING SPECIALTIES

MAID-O'-MIST, Inc.

3217 NORTH PULASKI ROAD . CHICAGO 41, ILL.

Customers Speak Their Piece on Air Conditioning

A report to NAHB by C. W. Nessell shows highly satisfactory results from the village experiment in overcoming some of the problems of air conditioning

INTERVIEWS AND INSTRUMENTS get the facts. Continuous records of temperature and humidity are made from floor to ceiling. Interviews with occupants supplement the mechanical findings

FOLLOWING IS a preliminary general report covering a survey made during the summer of 1954 of the comfort cooling performance of the year 'round air conditioning systems installed in the 22 residences comprising the NAHB Air Conditioned Village at Austin, Tex. The information herein is as complete as time permitted but does not contain full information on certain studies not yet completed. Additional data will be contained in the final general report which will be released later and published in American Artisan.

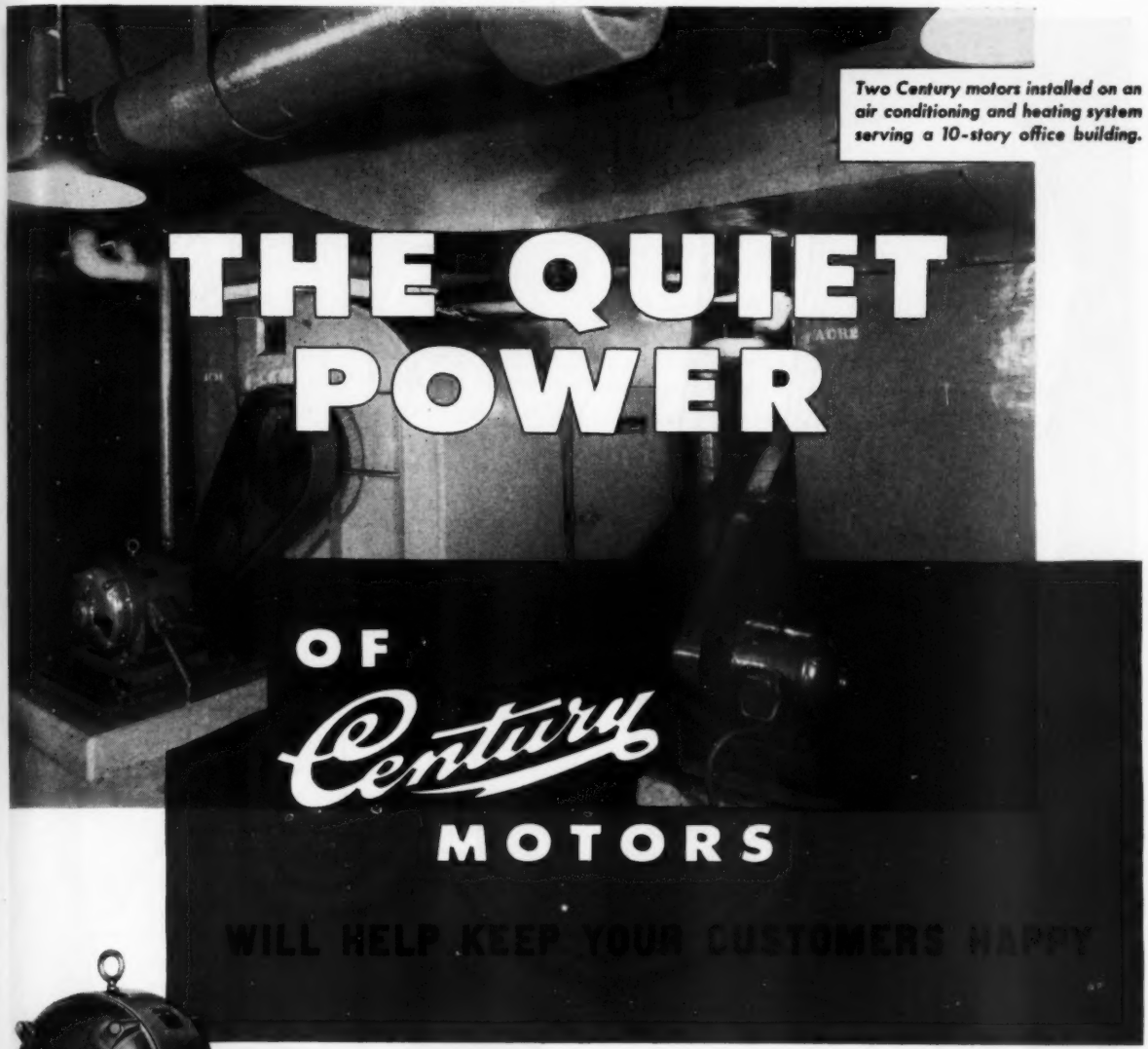
ONE OBJECTIVE of the village-wide survey was to determine those design and installation considerations that the building contractor can use to provide the greatest degree of cooling comfort at the lowest level of installation and operating expense.

There were 22 houses in the village. Twenty-one had been sold and were occupied, although occupancy in some had been for only a week or two before the survey was started. The unoccupied house was surveyed towards the end of the season with the equipment operating without an occupancy load. The survey on the first house was started near the end of June 1954, eight were started in July and 13 in August; the test period extended from June 26 to September 2. This encompassed the hottest period of a very hot summer for that locality when many days were considered at or above design temperature.

The surveys were conducted by placing a substantial number of automatic recording instruments in each house for a period of five to ten days to determine the general operating characteristics of the system under varying outdoor temperature and humidity conditions and occupancy habits. Unfortunately these outdoor variations were not of the *hoped for* magnitude because the weather remained consistently hot.

Specific Engineering Data Obtained

One day of that period was selected as *datum day* when additional instrumentation was installed with an accelerated program of manually and automatically recorded readings and observations. These included selected inside and outside wall surface temperatures, glass sur-

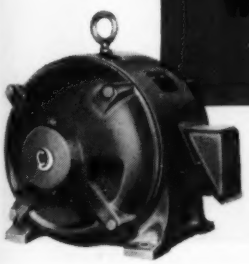


Two Century motors installed on an air conditioning and heating system serving a 10-story office building.

THE QUIET POWER OF Century MOTORS

WILL HELP KEEP YOUR CUSTOMERS HAPPY

-792



To assure quiet starting and efficient, dependable operation manufacturers do two things. They engineer their equipment skillfully *and* they choose motors carefully to bring out the best performance in their equipment.

Many leading manufacturers of heating, ventilating and air conditioning equipment depend on Century motors. They have found that Century's wide range of motor sizes and types helps them select motors that are exactly right for every job.

Century motor-power on the equipment you install is your first step toward complete customer satisfaction. Remember, Century's nationwide network of Branch Offices and Authorized Distributors is always at your service to help you with your motor problems.

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SPIRES: Copper solves the costly maintenance problem

One of the many applications where the long run economy of copper has proved itself is in the covering of spires. Whether it is repointing a spire of masonry construction or repainting one of wood exterior surface, the operation is a costly one. Copper sheets, properly applied, provide a lasting, weathertight covering that becomes an elegant landmark in the community—but of more importance is the freedom from expensive maintenance.

The copper-covered spire shown above is built in much the same way as a batten-seam roof. Details for edgings, etc., are simple, and copper covering is built into the wood construction of the ventilating dormers at the base. Several alternate types of battens or methods of joining at the corners are also shown. For small spires, 16 oz. copper of cornice temper does very well. For large spires, 20 oz. copper is preferred. 5454

Do you have the FREE Anaconda file of drawings? Each drawing shows a new or improved way to apply sheet copper. Each is printed on a separate 8½ x 11 page, handy for quick-reference filing. This series may be obtained absolutely FREE by writing for Portfolio S to **The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.**

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". . . all but one of the 21 owners were satisfied, at least with reservations, with comfort conditions"

face temperatures in some instances, ceiling temperatures, attic temperatures, a measurement of sun intensity, and frequent readings of the significant air temperatures in each room from early morning until late in the evening to determine the change in load characteristics as the sun moved around the house. In addition, the amount of condensate from the evaporator was measured, compressor (or its equivalent) operation was recorded, and a continuous record was kept of indoor and outdoor DB temperatures and relative humidities. In addition, a *datum hour* usually between 3 and 4 p.m. of the datum day was selected for a still more intensive check of the operational characteristics of the system and the comfort level produced within the house.

This report is distinctly a preliminary one. The time element involved did not permit the completion of the necessary studies. Omitted for this reason are such items as the air flow rates; velocity of the air discharged from the supply registers and its probable relationship to the room air stratification; comparative study of supply and return air register placement; heat gain in the supply air ducts under various conditions of installation and location; thermal lag with various types of materials and insulation in wall construction; a comparison of the effectiveness of various sun shading devices both inside and outside the house; and others of a similar nature. These points will be discussed in the final edition of the general report when it is ready and released at a later date.

Occupant Comments and Reactions

A study was made of the reactions of the occupants to the performance of their air conditioning systems. The data was secured by a carefully prepared list of questions asked by the laboratory crew. It should be remembered that the houses had been occupied for not more than a month or two in most cases, and in a few instances not more than a few weeks. A full season of living with the installation had not been experienced. The questions asked included some concerning occupancy habits that might affect the system's operation.

Ten of the owners of the 21 houses sold said they purchased the house primarily because it was air conditioned. One had the house built to his own design and insisted that it be air conditioned. Six owners liked the house plan or the location or both, and the air conditioning was incidental as a buying motive. Two bought because of the plan and the air conditioning, and the other had no comment on the subject. One said his previous home had been cooled, but the others apparently had never lived in an air conditioned home before moving to the village.

All but one of the 21 owners were satisfied, at least with reservations with the comfort conditions within the house, which included temperatures, control, and the temperature level maintained in the several rooms. Several complained that one or two rooms were either too warm or too cool. One complained that the house was not cool enough when four to seven guests were entertained. One desired cooler bedrooms and closed the register valves in the dining and living room areas to direct more cool air to the sleeping quarters. One stated that the performance was *reasonably good*, and the one dissatisfied owner stated that the house was *too warm*. A review of the chart recordings of room air temperatures in his house indicated he had reason to complain because the living room temperature reached 87 deg on a 100 deg day.

Fourteen of the 21 house owners were content with the relative humidity maintained in the house. One owner complained of dry nostrils every morning although the relative humidity in his house was usually over 46 percent. One complained of excessive humidity during and immediately after the operation of an unvented automatic clothes dryer. One stated the humidity was excessive in the morning and two others that it became uncomfortably high during the night when the compressor was cycling. One owner was completely unhappy about the relative humidity.

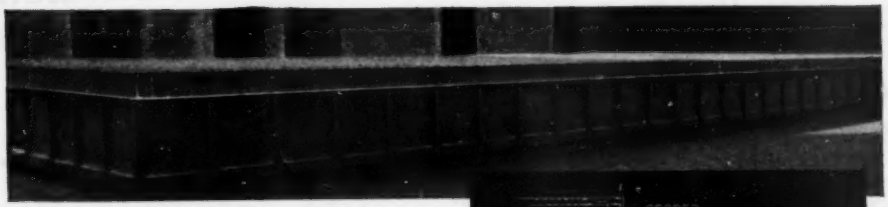
All but three owners reported that the windows were kept closed 24 hours a day. These three opened them occasionally because of lack of fresh air and a musty odor. One owner stated he preferred to sit on the patio in the evening because the air was *stale* indoors.

19 Blowers Operate Continuously

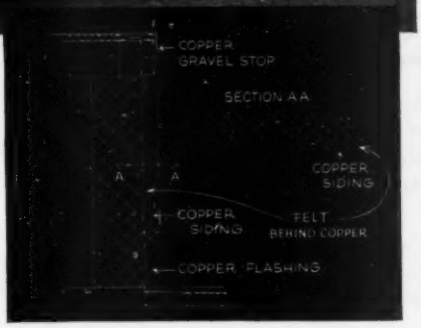
All but two owners allowed the air conditioning equipment to operate continuously throughout the cooling season. One of those who did not stopped the compressor operation at bedtime by setting the thermostat indicator at the top of the scale, allowing the blower to continue to operate, and then opened the windows. The other was an employed couple who turned it off completely when they left in the morning and started it again upon their return in the evening. They expressed satisfaction with this type of operation, but the temperature recordings indicate that comfort conditions were not approached until about midnight.

Eight of the 21 owners complained of the noise, with comments such as *believe it is excessive*, and *very ob-*

(*This article continued on page* 126)



MONITOR OF REVERE LEADTEX #15 COPPER of batten seam construction which houses the air conditioning ducts in the Fifth Avenue office of Manufacturers Trust Company. Of enduring, "ageless" copper, the centuries-tested metal, it will not rust, rot or deteriorate, seals against weather damage. One of Revere's Technical Advisors worked with the architects in the design of this monitor. Detail at right.



● In describing this drastic departure in banking institution design, Horace C. Flanigan, President of Manufacturers Trust Company, said, "The architecture of this bank, departing from the classic design of the past, uses to advantage the latest in form, construction and materials."

Among those materials is copper, not only man's oldest metal but in modern designs, such as this, man's newest metal, too. From its use on the 6-ton decorative screen of copper, nickel and brass to the flashing and monitor on the roof, the "ageless" metal copper stands ready to serve through the years without rotting, rusting or deteriorating.

In order to blend more perfectly with the off-white glazed brick used on the exterior of this great building, the architects specified Revere Leadtex #15 Sheet Copper. Revere Plain Sheet Copper was also used where color was unimportant. Altogether some 20,000 lbs. of copper were used.

One of the advantages architects will find in working with an organization such as Revere is a wealth of experience that can be a great help to them in many ways. In this particular instance one of Revere's Technical Advisors had the good fortune to be able to work closely with the architects in the design of the monitor which you see in the photograph at the top of this page. The architects and contractors were well pleased with the design which resulted from the Revere man's suggestions.

Why don't you take advantage of Revere's more than 153 years of experience in copper and its alloys? Also, we believe you'll find it worth your while to find out about the many money-saving advantages of Revere Keystone Thru-Wall Flashing.* *Patented

AT TOP OF PHOTO YOU SEE part of the 714 lbs. of Revere Keystone Thru-Wall, 3-Way Flashing used where monitor joins main wall of building. Weather is kept in its place (outside) with enduring Revere Copper Flashing on the job.

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Preliminary Report on Air Conditioned Village

(*Continued from page* 123)

jectionable. Ten said they had *no complaint,* or *no comment.* The other three were satisfied, one offering the comment that *it is very quiet.*

Thermostat Settings Varied

Since one house was not occupied, and one was manually instead of thermostatically controlled, the thermostat study involved only twenty houses. One owner maintained a thermostat setting of 70 deg, four at 72 deg, two at 74 deg, two at 75 deg, three at 76 deg, two at 77 deg and six at 78 deg. The lower temperature settings were not reached during the day. At least two families lowered the setting to 70 deg when entertaining to keep the house cool while the guests were visiting.

There was thermostat disagreement in at least one house — the wife raising the setting and the husband lowering it again as soon as he noticed it. Other than these, the thermostat settings were never changed during the cooling season.

Living Habits Create Problems

Many, but not all of the houses, had kitchen ventilating fans usually operated while cooking or baking was in process. In few instances, however, was any provision made in either the structure or the air conditioning system for the introduction of an amount of outdoor air equivalent to the quantity exhausted by the fan. Some of it probably entered through the furnace flue or the openings provided to ventilate the utility space.

Most of the homes had TV or radio sets in operation many hours a day. These, along with other heat releasing appliances such as automatic refrigerators and dishwashers should be taken into account in heat gain calculations.

In some cases, there was an appreciable sensible and latent heat gain from bathing. The number of shower and tub baths per family per day were reported and varied from two to five showers and two tub baths per day.

A SCALE OF SOUND levels for typical noise sources.

Source	*Decibels*
Threshold of hearing — acute	0
Threshold of hearing — average	15
Rustle of leaves	18
Whisper at five feet	25
Average dwelling	35
Quiet office	40
Average office	50
Average restaurant	58

Comments of Occupants

Some of the general comments offered by the occupants were:

Sleep better, health better
Eat better, eat heavier foods
Cook more, bake more
Children have more energy
Children play indoors more
Less difficulty with sinus trouble
Less dirt and dust in the house
Husband in better mood
Family has better dispositions
Entertain more
Stay home more
Fewer picnics and movies
Do more household work
Have more warm drinks
Would recommend to others
Cost not excessive

Most of the residents stated they were glad they bought the house.

Equipment Noise a Problem

Noise level readings were taken with a decibel meter of the type specified by FHA in bulletin ME-12. It was equipped with additional accessories required to make a vibration check. The meter was set on the 40 decibel weighted network scale, and readings were taken in the center of each room except for a bedroom or two not available to the laboratory crew. Generally they were taken when extraneous occupancy noise was at a minimum. Readings were also taken in the passageway or room in front of the opening to the space within the living area in which the equipment was installed. If the equipment was installed in the attic, a reading was taken in the area directly beneath it. Frequency and percentage pressure readings were also taken for further analysis if desired. Readings were not taken in one house because the condensing unit was being moved to an outdoor location when the meter was available.

One set of decibel readings was taken with only the air circulation blower operating and another set with both the blower and the compressor in operation. Those readings taken in the living area immediately adjacent

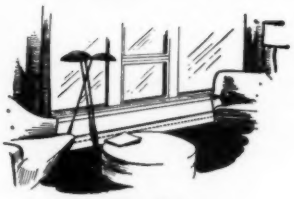
(*This article continued on page* 138)

HERE'S WHY *Thermo-Base* has become America's fastest-selling warm air baseboard distributor

comfort!

With Thermo-Base there are no hot zones at the ceiling, no cold layers on the floor and no frigid fringes along the wall . . . just "Gentle Warmth" everywhere!

beauty!



The distinctive styling of Thermo-Base gives that smart, attractive look preferred by homeowners. Full length drapes do not interfere with air distribution. Floors are kept free for wall-to-wall furniture arranging.

economy!

The better design and performance of Thermo-Base results in lower fuel bills . . . you will make friends by selling Thermo-Base!

Thermo-Base . .

. . . AVAILABLE IN 8, 5 and 3 ft. LENGTHS!

There is a complete range of units for easier, quicker installation. When desired, they can be combined for continuous coverage. Thermo-Base units are finished in a prime coat and may be painted to match the decoration after they are installed.

Super Thermo-Base is specifically designed to produce the greater volume of delivery required in larger installation. Available in 8 foot lengths only.

Thermo "30" Diffuser, America's lowest priced baseboard diffuser is available for highly competitive jobs. Available in 30 inch lengths only.

NEW FREE CATALOG makes any dealer a heating and cooling expert!

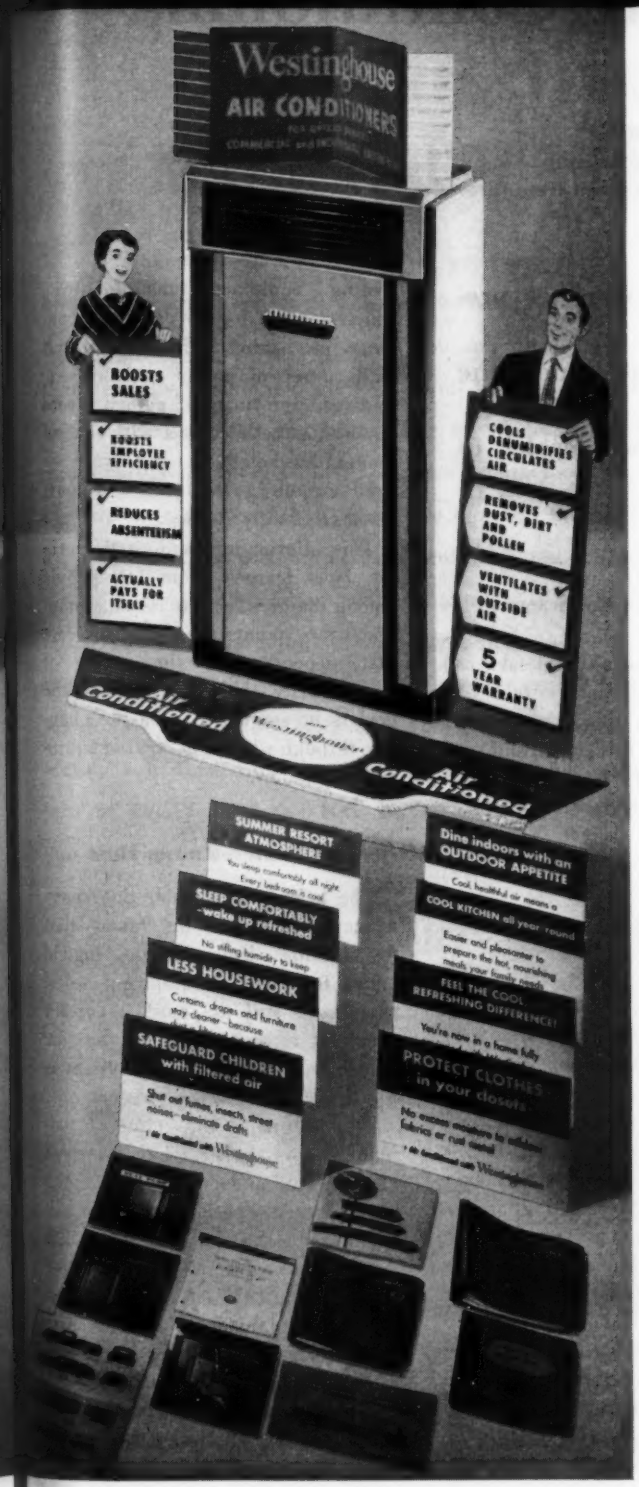
Send for your copy today . . . just drop us a line on your letterhead!

GERWIN INDUSTRIES, INC., Michigan City, Indiana

Your Westinghouse Distributor

Mr. Thomas F. Joyce, President of Raymond Rosen & Company, Inc., Philadelphia, says: "We find that Westinghouse National Advertising, plus complete sales promotion back-up, helps our 40 Westinghouse Air Conditioning dealers locate prospects—and make more sales."

Increases Your Profit with . . .



A Complete Sales Promotion Package

To Locate Prospects—Close Sales

Without a doubt your Westinghouse distributor can supply you with the most *complete, up-to-date, powerful promotion package in the industry.* And all of it has been designed for you with one purpose in mind—to help you locate potential buyers and close Westinghouse air conditioner sales.

Everything that can help you sell has been made part of this program. Just check this list!

Local Identification and Display Material . . . Telephone Directory Listings . . . Truck Painting Package . . . Newspaper Advertising . . . Direct Mail . . . Radio and Television Advertising . . . Catalog and Data Sheets.

Your Westinghouse distributor is the man to see for *complete* information on a program that will give prospects the information they want, strongly identify you as a Westinghouse air conditioning dealer, build confidence in you as a businessman.

The Westinghouse Promotion Package will develop leads that you can connect to sales. Call or write your Westinghouse distributor or fill in the coupon below for the full story on this year's biggest promotion offer. Make '55 the *best*, most *profitable* year you've *ever* had!

National advertising in SATURDAY EVENING POST, BETTER HOMES & GARDENS, TIME, BUSINESS WEEK, SMALL HOMES GUIDE AND HOUSE AND HOME, plus many more tells everybody you're the man to see for the best of buys in air conditioning.

Westinghouse brand name advertising and promotion . . . including 2 TV shows (Best of Broadway and Studio One) make Westinghouse a household name.

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I want the *complete* story on the 1955 Westinghouse Air Conditioning Line . . . and Sales Promotion Package—"Invitation to Leadership."

☐ I am not yet in the air conditioning business
☐ I am now an air conditioning dealer
☐ I now handle the following lines: . . . . . .

NAME . . . . . (*please print*)

ADDRESS . . . . . .

CITY . . . . . ZONE . . . . . STATE . . . . . .

Future of Residential Air Conditioning

By H. D. Bissell
Director of Merchandising
Minneapolis-Honeywell Regulator Co.

- **Sales will continue to rise, and those who are prepared stand to profit handsomely**
- **The heating dealer is the logical man to handle the boom in residential comfort**
- **But he needs help from the heating wholesaler in meeting the demands involved**

THE RATE at which the residential cooling business already has expanded and the rate at which it promises to continue to expand should make it one of the real boom industries of our age. This is a comfort boom—one that appeals to the American instinct for pleasant living. Moreover, unlike other new boom industries, it has the advantage of ready-made channels for distribution. I refer, of course, to heating dealers — the men who have had many years of experience in the residential comfort field.

Conceivably, this boom could reach proportions beyond our present expectations. And it may well involve everyone previously associated with the heating industry. (*Editor's Note*—The material presented here is taken from an address given by Mr. Bissell to members of the National Association of Heating Wholesalers in Philadelphia January 20.)

As a participant in this promising new market, I want to discuss the opportunities and challenges as we see them, and especially those that confront the heating wholesaler. They are of tremendous significance to his future.

Though the heating wholesaler can have a particularly important and lucrative role in this expansion he stands to miss this opportunity if he continues as he has in the recent past. Here's why I think this is true, and why I believe it is something that concerns him very greatly.

"Boom" Based on Studies

What I have to say about the future of air conditioning, I say with reasonable assurance, not from any prophetic hunches, but on the basis of studies by our marketing research staff. As can be appreciated, we have a great deal to gain from a clear knowledge of where this market, as well as the heating market in general, is going. Our research men did some intensive work this past year in every region of the United States. Hundreds of interviews were conducted with wholesalers, dealers, builders, and consumers as well as lengthy personal and confidential interviews with the top management of 39 heating and cooling equipment manufacturers which account for 85 percent of national production in their fields. A mail survey of power company executives, information gained from our normal sales contact with several thousand wholesalers and statistics from various government and market sources were studied.

This information, and particularly the facts learned from top people among major warm air furnace manufacturers, points clearly to the fact that, depending on the degree of their activity, the wholesaler and the dealers he services can be the channels through which this cooling equipment can flow.

Heating Dealer Knows How

The heating wholesaler does have a major factor in his favor—that the heating dealer is the logical outlet for cooling equipment sales. Heating is still the most important comfort factor except in the far South, and a good cooling system is based on a good heating system.

The heating dealer, after all, already knows the principles of good heating. He understands air distribution systems, he knows how to calculate heat losses and air flow through ducts, he knows how to fabricate duct work, he has a sales organization and a service organization, and his past work has gained him the confidence of the people in his community.

What he must do, with the help of the heating wholesaler, is develop

(*This article continued on page* 134)

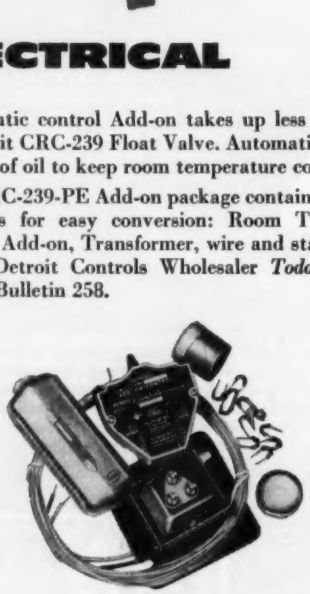
for More Profits

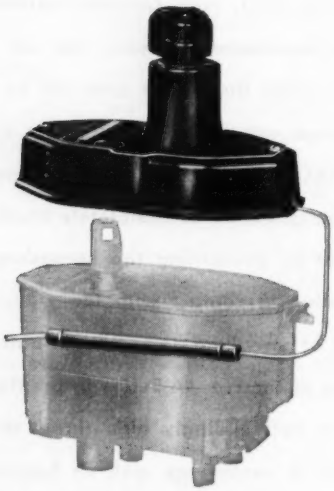
SELL **DETROIT**
AUTOMATIC SPACE HEATER
CONTROLS

ELECTRICAL

Thermostatic control Add-on takes up less space, fits any Detroit CRC-239 Float Valve. Automatically regulates flow of oil to keep room temperature constant.

The CRC-239-PE Add-on package contains all necessary parts for easy conversion: Room Thermostat, Electrical Add-on, Transformer, wire and staples. Talk to your Detroit Controls Wholesaler *Today* . . . or write for Bulletin 258.





MECHANICAL

Thermostatic Flame Modulator automatically regulates flow of oil to keep room temperature constant. Once the temperature adjusting knob has been set for desired room temperature, no further adjustment is necessary.

Entirely mechanical, the CRC-239-MP Add-on requires no electrical connections. It's easily and quickly installed! Fits any Detroit CRC-239 Float Valve.

Talk to your Detroit Controls Wholesaler *Today* . . . or write for Bulletin 237-A.

DETROIT CONTROLS CORP. manufactures a complete line of controls for the heating, air conditioning and refrigeration industries.

DETROIT CONTROLS CORPORATION
5900 TRUMBULL AVE. • DETROIT 8, MICHIGAN
Division of AMERICAN RADIATOR & STANDARD SANITARY Corporation

Representatives in Principal Cities • Canadian Representatives:
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AUTOMATIC CONTROLS for REFRIGERATION
AIR CONDITIONING • DOMESTIC HEATING • AVIATION • TRANSPORTATION • HOME APPLIANCES • INDUSTRIAL USES
Serving home and industry
AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

JOHN WOOD Automatic GAS water heaters

COST LESS TO OPERATE

AND YOU CAN PROVE IT!

It's SAVINGS that make sales

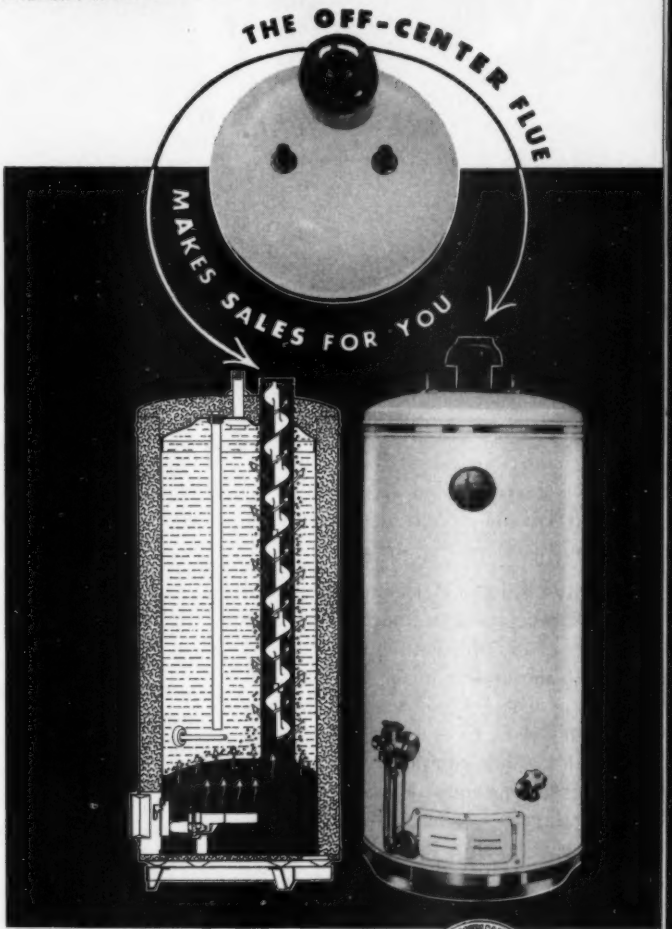
It's here—ready to work for you! JOHN WOOD has a water heater story that's a natural for sales! BY ACTUAL TEST, John Wood Water Heaters cost your customers less per gallon for hot water ... make *savings no other construction can match!* That's because the OFF-CENTER flue construction—developed and featured by JOHN WOOD—beats every known water heater construction for economy in test after test.

That one fact gives you a real edge on all your competitors. Nobody has an economy story like yours when you feature JOHN WOOD. *Nobody* has the profit chances you get with the proved JOHN WOOD economy story!

Here's potent sales material—backed up by the hardest hitting program of promotion and advertising yet—*all working for you and your bigger profits.*

Ask your JOHN WOOD wholesaler for the full story.

Write for FREE Book "How Do You Judge a Water Heater"—Today!



BEATS the rest by EVERY test

JOHN WOOD gives you more to build sales—

- → COMPLETE LINE of sizes and styles, vertical and table top models
- → A PRICE FOR EVERY BUDGET
- → THE ONLY WATER HEATER OFFICIALLY SELECTED BY *Mrs. America*
- → FULL PROMOTIONAL HELPS to build your sales

Finest glass-lined or galvanized water heater anywhere!

JOHN WOOD COMPANY

HEATER AND TANK DIVISION

Conshohocken, Pennsylvania and Chicago, Illinois

Heating Wholesaler's Role in Air Conditioning

(*Continued from page* 130)

AUTHOR H. D. BISSELL (center) discusses some of the important points in the merchandising of residential air conditioning with Walter J. Baak (left) and Glenn A. Ashburn

his understanding of the cooling aspect of year 'round air conditioning and how to add it to the existing equipment he has already installed.

And it is also logical that the wholesaler maintain in the cooling field the relationship which he has had with the dealers in the heating field. It is true, of course, that heating wholesalers have never done much with cooling equipment; their business has depended almost entirely on heating equipment sales. But it is true largely because there have been so few residential installations until recently. Statistically, there were practically none before 1946, and only 20,000 between that year and 1951.

In the past, most of the cooling installations were commercial or industrial jobs which required elaborate engineering and sizeable capital investment, and which were installed by firms specializing solely in air conditioning. As a matter of fact, until the war cooling equipment was found almost exclusively in restaurants, theaters or large office buildings. Occasionally we might find an expensive home with cooling, but it was simply an industrial job done over to meet residential requirements.

For this kind of business it was not necessary for cooling equipment manufacturers to seek out warm air heating dealers operating in residential markets. As a matter of fact, it was necessary that they employ air conditioning contractors who had specialized engineering departments.

But since 1951 the residential cooling business has increased tremendously. Some idea of this increase in relation to heating installations in new homes is revealed by our studies.

In new homes in 1952 the ratio was one central cooling unit to every 63 central heating units. In 1953 the ratio had narrowed to one cooling unit for every 20 central heating units. During the past year the ratio reduced to one in 16. We anticipate during 1955 that with proper merchandising, as many as one out of every eight homes built in the United States will be centrally air conditioned. This ratio would mean 150,000 air-conditioned homes built in 1955, and estimates of the market clearly indicate there will be 1,000,000 air conditioned homes in the United States by 1958, and at least 7,000,000 installations by 1965.

The question remains—who will sell this equipment, and who will install it? Again let's refer to our market studies.

Small Dealers Need Help

In the present marketing situation there is much confusion. First of all, it is clear that the majority of people who traditionally have been the residential climate businessmen—the residential heating dealers to whom wholesalers sell—are not now able to command a large part of this market. Many of them unfortunately do not yet have the technical know-how which will permit them the ease and security they need to install this equipment successfully. For example, a member of our home office staff recently asked his local heating dealer, who operates a fairly small shop, to estimate an air conditioning job for his home. Then, somewhat surprised at an initial bid of over $1900, he asked for help from several of our engineers. With their experience and knowledge, it soon became clear that the job could be done for half the amount asked.

The point is that dealers can't afford to be so far off. In a heating job, if there are questions of how big an input of heat is necessary, the dealer might simply increase the size of the unit, say from 90,000 to 100,000 Btuh. Little extra work and very little extra expense are involved. But this can't be done with cooling equipment. Heat gains that help in heating are murderous in cooling. The dif-

(*This article continued on page* 138)

Some guys have all the luck! While other heating dealers try to explain the advantages of home heating equipment, you can show your builder how to cut building costs and design his home for greater living comfort with the Norman Southerner.

And all becauseof an entirely different kind of sales demonstration being furnished to Norman heating dealers. It's called the Norman Sketchbook! Not an ordinary piece of literature, but an attractive sales presentation that shows your builder how the Norman Southerner gives him a freedom of design to plan his home with more living space. Maybe you've already tried to tell him how the Norman Southerner will do the job. Now you can show him — BEFORE he builds his next home.

Arrange a demonstration of the Norman Sketchbook. Be sure to let him see the many different home illustrations, including the most popular designs in today's building market.

He'll really go for the floor plan drawings, showing the complete Norman Southerner heating installation in EVERY HOME. What better proof of the amazing versatility of the Norman Southerner for all home heating installations?

Write for your copy of the Norman Sketchbook today!

Sitting pretty

with the Norman Sketchbook!

Norman heating dealers use this exclusive, new sales presentation to sell builders on the advantages of Norman Southerner heating.

The Norman Southerner
Horizontal Forced-Air Gas Furnace

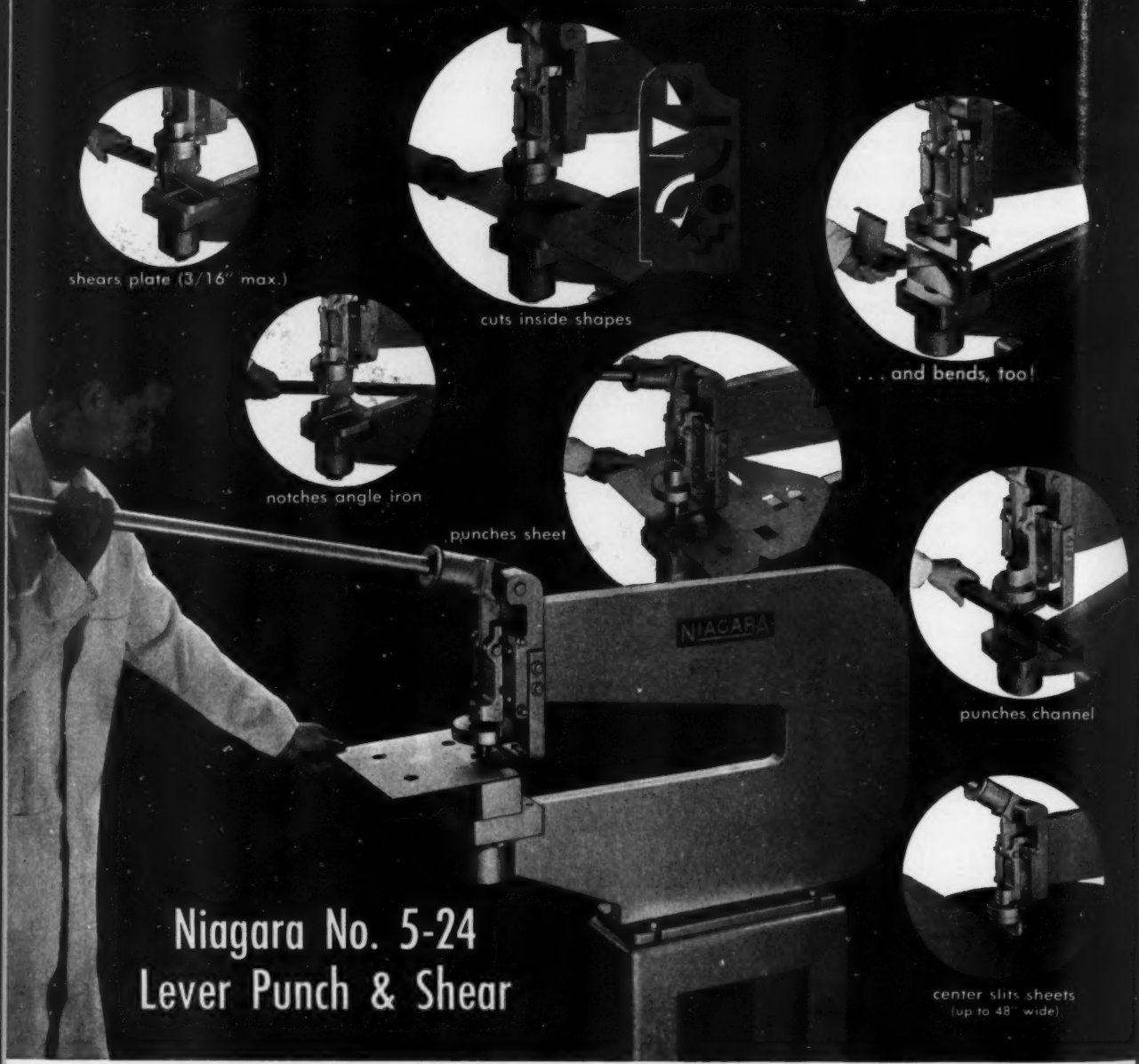
New local advertising package

Another big promotion for Norman heating dealers. A complete package of advertising and sales promotion material . . . including local newspaper advertising mats. Send for your free copy today!

Norman PRODUCTS COMPANY • 1150 Chesapeake Avenue
Columbus 12, Ohio

Manufacturers of a Complete line of Gas Heating and Air Conditioning Equipment.

Here's a machine that's almost a shop in itself!

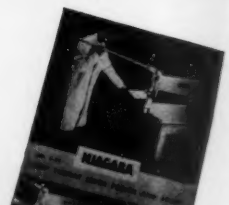


Niagara No. 5-24 Lever Punch & Shear

Because it's so productive . . . because it can handle so many different types of jobs, Niagara's No. 5-24 Lever Punch & Shear never sits on the sidelines. Its *continual* usefulness has been proved *repeatedly* in numerous industrial sheet metal shops, maintenance departments, experimental and model shops.

With a 5-ton capacity and a 24-inch throat, it can be equipped (optionally) as a punch or shear or brake . . . *or all three!* An unusually large selection of punches and dies is available for turning out a tremendous variety of work.

To learn more about this machine and the almost limitless number of jobs it can do for you, write for illustrated Bulletin 79 today.



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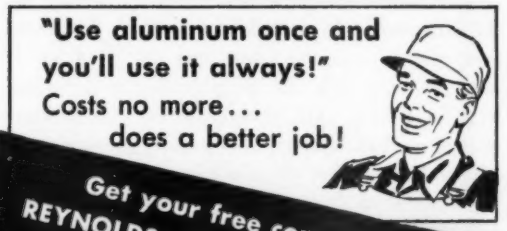
America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

Face the Facts of
AIR CONDITIONING
and you'll use Rustproof Ducts of
REYNOLDS ALUMINUM

Most homes today are being built either with full air conditioning or ready for it. And that changes the ductwork picture! Cold ducts mean moisture condensation—rust, with ordinary metal. Homebuyers are being warned—on Reynolds hit TV show, "MR. PEEPERS," in magazine ads. Builders are featuring rustproof ducts of Reynolds Aluminum. Tie in with this campaign that makes *your* work more important. Use Reynolds Aluminum, and identify it with the Reynolds Seal. Order through the nearest Reynolds Sales Office or distributor listed under "Aluminum" in your telephone directory. Or **Reynolds Metals Company,** General Sales Office, Louisville 1, Ky.



Designed in REYNOLDS ALUMINUM

- **FREEDOM FROM RUST** plus these extra advantages:
- **BETTER AIR FLOW** because aluminum interior surface stays smoother
- **BETTER HEAT CONTROL** because aluminum is lowest in emissivity
- **LIGHTER TO HANDLE, EASIER TO WORK**
- ...and experts prove **IT COSTS NO MORE!***

*The authoritative "Building Construction Cost Data, 1954" says: "On a pound basis, almost 3 times as much ductwork can be shop fabricated and erected in aluminum as in steel. The cost of finished duct in place on a job basis is about the same..."

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Please send me **FREE** copy of your handbook, "ALUMINUM AIR DUCTS"

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Address_____

City_____ State_____

SEE "MISTER PEEPERS," starring Wally Cox, Sundays, NBC-TV Network.

REYNOLDS ALUMINUM

Dealer Needs Wholesaler's Help

(*Continued from page* 134)

ference between a 2 hp and a 3 hp unit is several hundred dollars. In addition, a unit which is too small can't satisfy the cooling requirements, and a unit which is too large can cause many costly and bothersome problems.

These smaller dealers who haven't the experience in installating summer cooling equipment but who do have contact with the people who will be having this equipment installed, need the assistance of heating wholesalers to meet the challenge of the new boom. It is clear that some aid must be given these dealers if they are to succeed to the business which is logically theirs.

Answer the Challenge

This responsibility may well rest with the heating wholesaler. What he does about his opportunity can have an important bearing on his future in this new field. First, his salesman and dealer education program must be enlarged. Dealers need to be shown how to solve cooling problems. It may be advisable to avail him of advisory engineering service—a specialist to whom the dealer and the wholesaler's salesmen can come for advice. One man in the wholesalers' organization who knows the whole air conditioning field and in whom dealers have confidence will strengthen the wholesaler's organization and his relationship with his dealers. This service is particularly important now, for cooling systems will become simpler for dealers to install as they gain experience.

I think it is important at this point to mention some of the information our researchers have found about new developments and new equipment in the field.

The introductory wedge in the residential cooling market was the window or room air conditioner. Its rise as a merchandisable item was phenomenal, and its peak year will quite likely be 1958 when a million and a half units, worth over half a billion dollars are expected to be sold. When sales of room conditioners level off, we can still expect a substantial and steady sale for some years to come.

By 1958 however—just as central heating overcame space heating as the norm—central residential air conditioning will overtake the individual room units dollarwise.

To summarize, it is vitally important that the heating wholesaler provide the aid the warm air heating dealer needs in order for both to realize a large share of the cooling market and maintain their position in the heating market.

Residents Report on Air Conditioned Village

(*Continued from page* 126)

to the opening into the equipment room were used as a base to rate the acceptability of the installation with respect to a 40 decibel maximum noise level.

It was found that only twelve installations had a rating of 40 decibels or less when only the air circulation blower was operating. Incidentally, it should be noted that the *blower only* operation noise level will be that of the equipment operating on the heating cycle, with a slight increase for burner operation and combustion noise.

It was further found that only three of these twelve installations had a noise level of 40 decibels or less when both the blower and compressor were in operation. Therefore, only three of the 21 houses measured had equipment that would be approved under a specification writing the noise level to 40 decibels or less.

Causes of High Noise Level

In some installations the equipment was mounted directly on the concrete slab floor, in others it was placed on the joists in the attic, and in still others was placed on a wooden platform or floor. Some of these types of construction are more susceptible to vibration or more resonant than others.

Noise level readings were also attempted at approximately 10 ft from cooling condensers, forced draft and induced draft cooling towers mounted outside the building. While these could not be taken successfully in every instance, those that were taken varied from 41 to 58 decibels, with most of them 50 decibels or higher. These readings were taken because of complaints of noisy equipment by the neighbors.

It is believed that future study of the noise levels and of vibration rates that were also taken will indicate some of the reasons for relatively high noise level readings. Some of it is due to equipment design, particularly with respect to the mounting of the blower. However, it is already indicated that the equipment is not entirely to blame. The wooden platforms built for mounting the equipment were not properly isolated from the framing of the structure and little, if any, attempt was made to apply sound deadening materials to the equipment room. The reduction of the noise level appears to be as much the responsibility of the builder and architect as it is that of the equipment manufacturer.

Additional details from this report will be published in subsequent issues of American Artisan.

Good things happen when you "sign up" with G.E.

If politicians were home heating and cooling dealers, they'd all switch to G.E. That's because they believe in the adage "if you can't beat 'em—join 'em."

And a good idea for dealers who are tired of tilting at windmills or bucking headwinds is to jump on the G.E. "brandwagon"...and enjoy the advantages that belong to the man who hangs the G-E monogram over his shop. For example;

- *A full line of the finest home heating and cooling units made.*
- *Units designed for every house, no matter what the design, type, size, location or climate.*
- *Units that carry the famous G-E Warranty offering you and your prospects more protection mileage than any other in the business. And that includes a 5 year protection plan on the sealed-in system of the cooling unit.*

Like most G-E dealers, you'll find that the good things in life come a lot easier and faster when you work hand-in-hand with G.E. Send the coupon below. It is just possible there is a juicy franchise still open in your territory. When you get the full story on the great G-E line and the "Franchise with a Future"...we think you'll be glad to "join us."

HOME HEATING & COOLING DEPT.

Progress Is Our Most Important Product

GENERAL ELECTRIC

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HOME HEATING & COOLING DEPT. AA-35
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Yes, I want the facts on why "signing up" with G.E. will step up my sales and progress.

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sell the name your customers want

. . . the name on over 5 million units now in use.
. . . for 46 years *the* name in automatic home comfort.
It's BRYANT, of course . . . the line that sells and stays sold!

be "Mr. B"

(AUTHORIZED BRYANT HOME COMFORT DEALER)

Only "Mr. B"—the Bryant Home Comfort Dealer—has *all 8* of these selling assets to build his business BIG:

1. A name customers know and want
2. The most complete line of automatic heating, air conditioning, water heating
3. Quality equipment for every market
4. Exceptional distributor service
5. Professional sales training
6. Personalized selling tools for you
7. National advertising featuring you
8. Co-op "Mr. B" ads for local papers

For bigger profits now, for a secure and prosperous future—see your Bryant Distributor. Ask him about Bryant's big "Mr. B" action program, and how it can make sales and money for you!

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AUTOMATIC HEATING
AIR CONDITIONING
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field

You're *sure* of this

A heating man we know put it this way:

"We have enough headaches in this business without borrowing any. So, when we find a product that always works, that's it. Take a Field Draft Control. I install a Field, turn my back and forget it. That dependability is worth many dollars to me. And where dollars are at stake a few pennies more or less in the price don't mean much."

FIELD CONTROL DIVISION
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Affiliates { Conco Building Products, Inc. • Brick, Tile, Stone
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You have put your faith in

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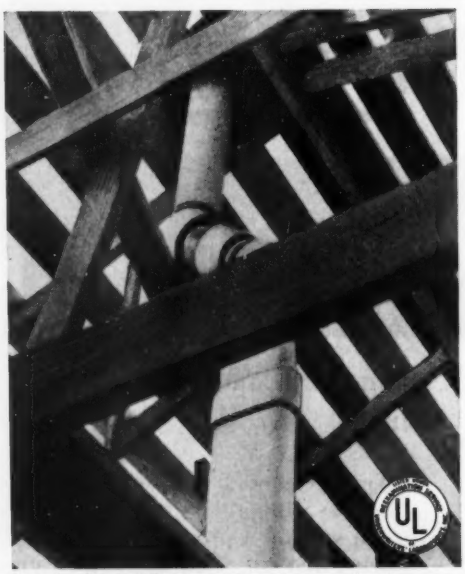
more than 15,000,000 times

Transite Gas Vent Pipe *goes in fast, provides proved protection*



Transite Type B Gas Vent Pipe is the only pipe continuously listed by Underwriters' Laboratories, Inc. since 1932, for use as a vent pipe for domestic gas burning appliances. Type B-W Gas Vent Pipe, also UL-listed, vents recessed wall heaters.

J-M Transite® Gas Vent Pipe is a profitable and practical way to vent domestic gas burning appliances. Contractors find it easy to handle on the job. Tough and strong, it can be installed quickly at any stage of construction. It can be supported anywhere along the pipe barrel . . . only minimum bracing is required. A complete line of round and oval pipe and round and oval fittings makes it suitable for any type of gas venting job.

For the homeowner, Transite Gas Vent Pipe is a popular choice—and a wise one, too, on the basis of long economical service. Made of asbestos and cement, two of Nature's most durable minerals, Transite Pipe has proved itself in year-after-year protection against the discomfort and health hazards of waste gases improperly vented. Transite can't rust, resists corrosion and is non-combustible.

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K. E. Buhrmaster reports complete satisfaction with Winkler Direct Factory Franchise

In Scotia, New York, J. H. Buhrmaster Co., Inc. does a booming business in Winkler Automatic Heating and Cooling Equipment. Nineteen pieces of rolling equipment and thirty people are required to handle sales and service of this company.

In a recent letter, K. E. Buhrmaster, president, points out the reasons for his success with Winkler Products. He says—

"Our Winkler Direct Factory Franchise was signed in the Fall of 1948. That was the start of a most profitable and pleasant relationship.

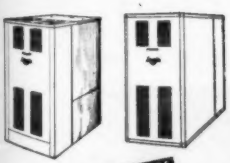
"The Winkler line of heating equipment is full of superior features. The Winkler Training Institute has great value from the standpoint of both sales and engineering. Your merchandise aids have increased our selling power.

"Beyond all this, we have found the personnel as well as the policies of the Winkler organization to be of the highest type."

WINKLER TRAINING INSTITUTE MAKES *SALESMEN!*

In this completely equipped school, Winkler turns men into star salesmen. The training course is *free* to Winkler dealers and their personnel. Individualized instruction by factory experts includes business promotion methods, product demonstration, and successful ways to uncover prospects and close sales.

An Engineering course is also offered for instruction in sizing, wiring, and servicing Winkler Products.



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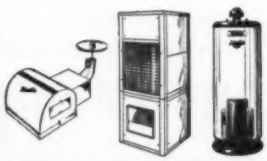

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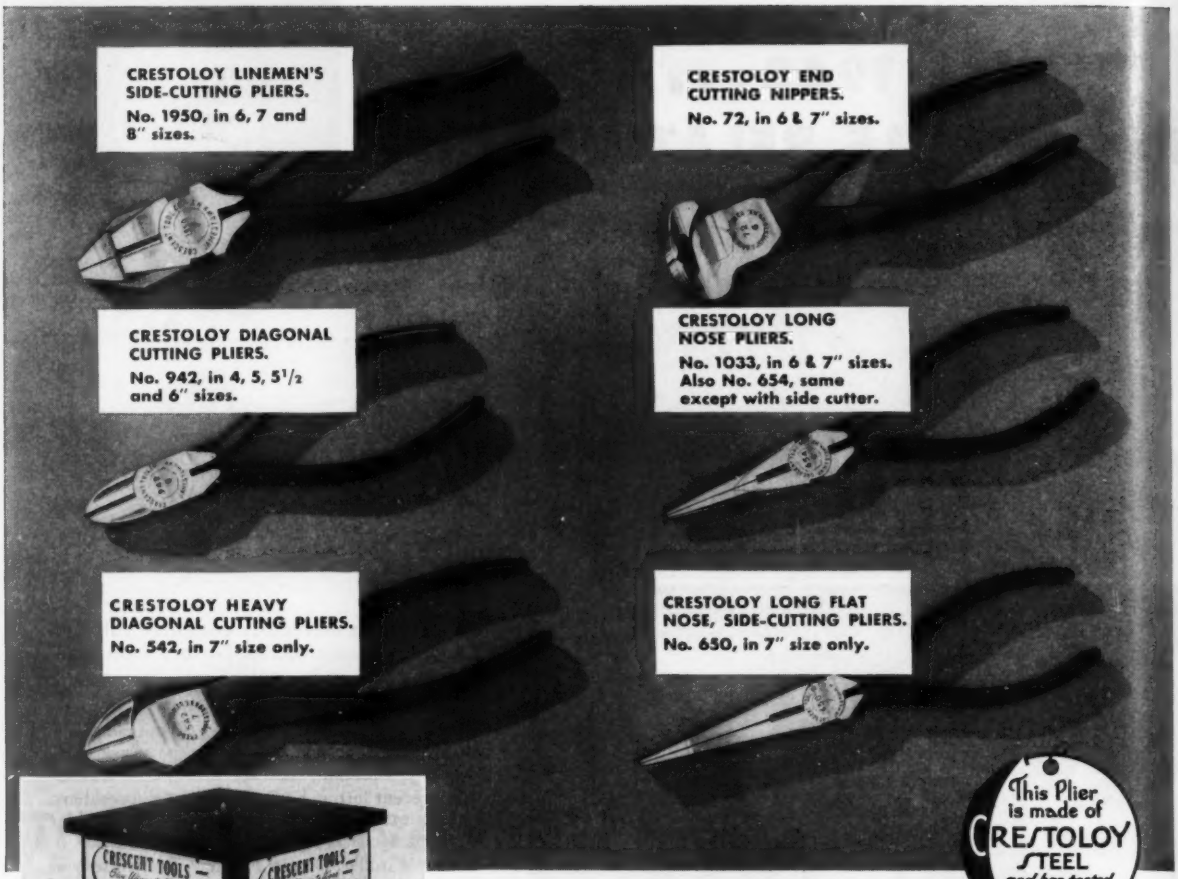

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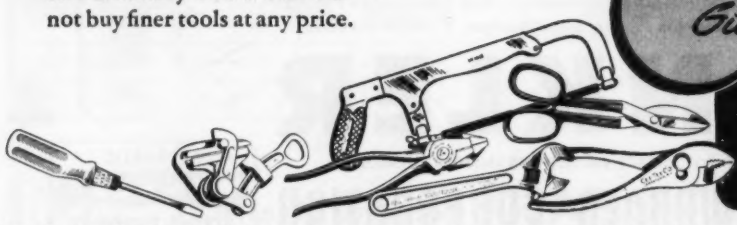

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Every product in the Curtis line is built with quality material and workmanship.

Curtis equipment is known around the world for its dependability and efficiency.

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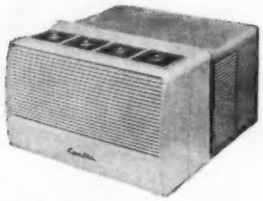

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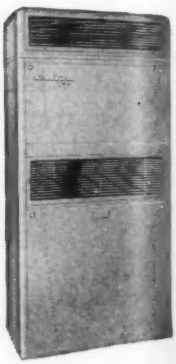

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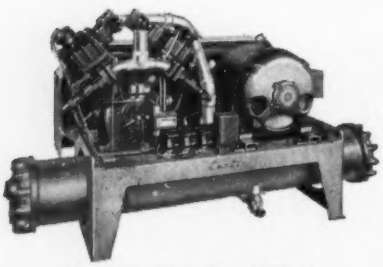

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Evaporative Condensers, Cooling Towers and Air Handling units to match

Residential cooling and heating units

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National advertising in *Saturday Evening Post, Time, Newsweek* and *House and Home,* plus many other publications helps sell Curtis to your customers and prospects. Attractive new sales literature is available to help you sell in your local area.

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OF CURTIS MANUFACTURING CO.

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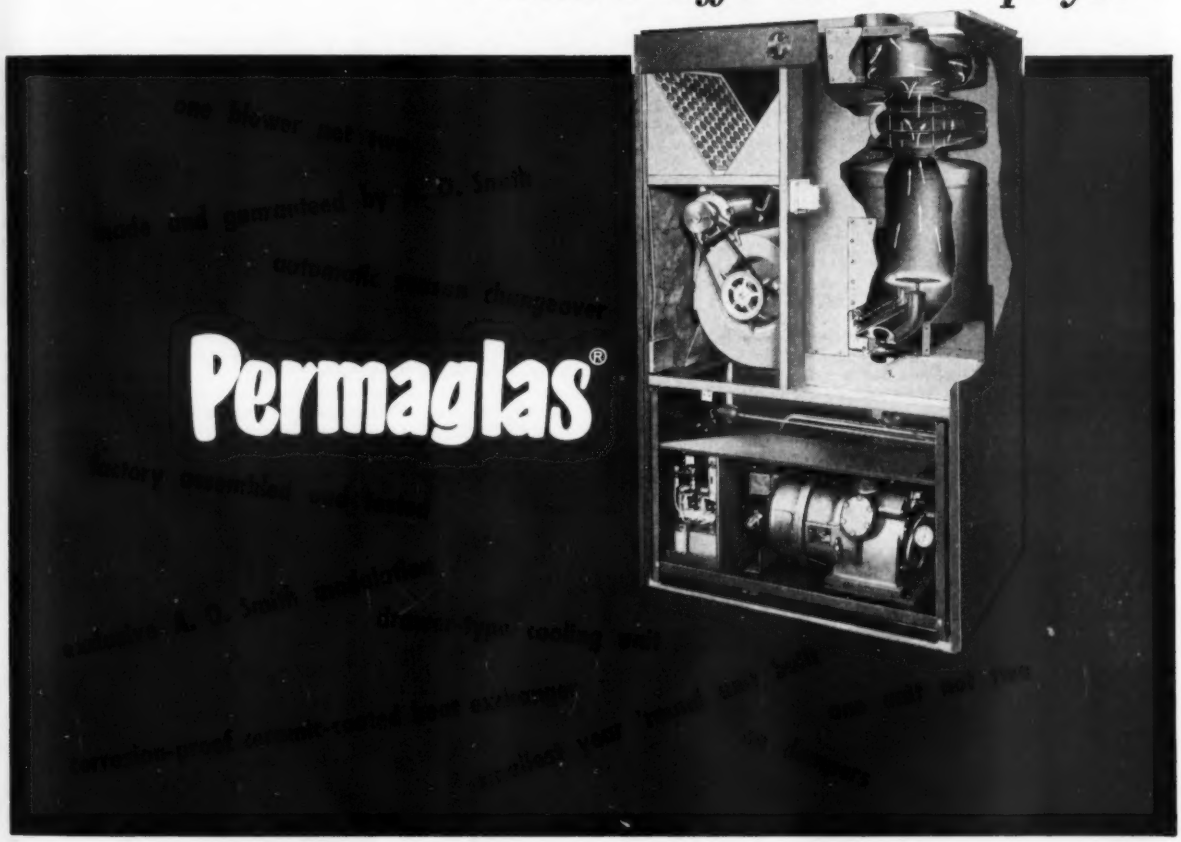
here's a year 'round

air conditioner

that's

different

...with a difference that pays!



Permaglas®

HEATING AND AIR CONDITIONING

Permaglas glass-lined water heaters mean freedom from rust and corrosion to over 2,500,000 families. A. O. Smith-Burkay Commercial Water Heaters are the world's most popular in the field.

Permaglas is going places.....are you aboard?

A few valuable franchises are available.
Write now for full information.

Through research ...*a better way*

A.O.Smith

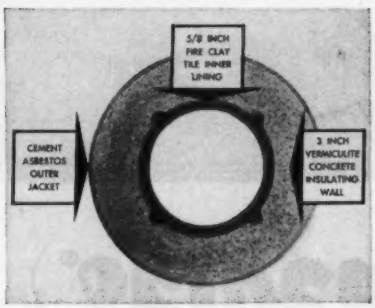
CORPORATION

PERMAGLAS DIVISION • KANKAKEE, ILLINOIS

New, attractive De Luxe Housing Cap Assembly and massive-appearing De Luxe (Brick-Panel) Housing of the Van-Packer Packaged Masonry Chimney provide buyer acceptance of a conventional chimney. Why not sell the *entire* heating installation — earn a profit on both heating plant and *chimney*. You can do it with Van-Packer, the pre-engineered, completely packaged, lifetime masonry chimney. You cut out costly job delays and call-backs because you put in the entire installation. You're sure its done right, because you do it from start to finish. Over one-half million Van-Packer Chimneys are now in use throughout the United States and Canada.

Profit on both heating plant and masonry chimney—Sell Van-Packer

Goes up in 3 man hours. No special skills required. Ceiling or floor suspended, the Van-Packer installs directly over furnace. Acid-proof cement in handy plastic squeeze bags seals flue joints permanently.



Approved for all fuels—the only masonry chimney tested and listed by UL for coal, oil or gas. Approved by major building codes. 14" OD flue section installs between joists on 16" centers without joist cutting.

34% better draft with the Van-Packer. Heating plant operates more efficiently. Find out how you can earn extra dollars by putting in the entire heating installation, write Van-Packer Corp. today.

Van-Packer PACKAGED MASONRY CHIMNEY

Van-Packer Corporation • Bettendorf, Iowa • Phone DAvenport 5-2621

For detailed facts on Van-Packer Chimneys and how they can earn hard cash for you, send for Bulletin 11-AF28.

Airline

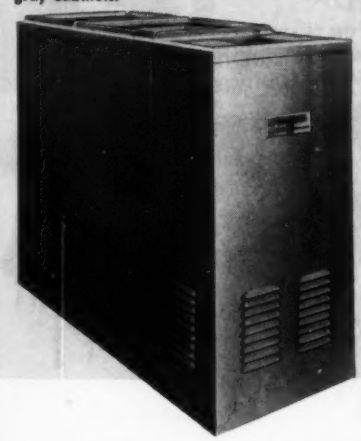
The ALL NEW line of Heating and Air Conditioning

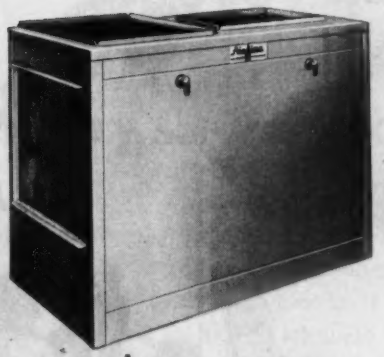
Get set for sales! Make way for profits! Here's AIRLINE—the *all-new* line of heating and air conditioning that really means business for you! All-new—and *performance-proved!*—gas and oil fired furnaces. New air and water cooled air conditioners. New incinerators. New gas and electric water heaters. All designed for easy, low-cost installation and top profit for you. And all available for shipment right now!

So if you're thinking big—if you're looking ahead—get the full Airline story right now. Time's a-wasting—so mail that coupon today!

ALL NEW! OIL FIRED FURNACES

Exceptionally compact Hi-Boy, Lo-Boy, Counterflow and Suspended models. Sizes from 80,000 to 165,000 Btuh output at bonnet. Outstanding heat exchanger assembly, factory installed. All models convertible to gas. Beautiful green and gray cabinets.





ALL NEW! SUMMER AIR CONDITIONERS

Both air cooled and water cooled models, including remote units. Unusually compact 2 and 3 ton sizes. Shipped fully assembled, ready to install. Handsome hammertone finish on cabinets.

ALL NEW! GAS FIRED FURNACES

Hi-Boy, Lo-Boy and Counterflow units from 70,000 to 200,000 Btu input. High efficiency sectional heat exchanger. Built-in draft diverter. Fully enclosed controls. A.G.A. approved for all gases and close clearances. Sparkling two-tone gray hammertone finish.

GO AND GROW—WITH Airline

PRODUCTS OF BORG-WARNER

Airline Heating and Air Conditioning equipment is manufactured by Ingersoll Conditioned Air Division of Borg-Warner Corporation. The engineering skills and production facilities of these organizations assure you fine quality and dependable performance.

ENGINEERING B-W PRODUCTION

INGERSOLL CONDITIONED AIR DIVISION
Borg-Warner Corporation
Dept. AA 760 E. Vine St., Kalamazoo, Mich.

Rush Airline details for:

- ☐ Franchise Distributor
- ☐ Dealer
- ☐ Have your representative call on us.

Company_____

Name_____

Address_____

City_____ State_____

Another good reason why you'll do better with Thatcher!

All prospects want the feeling of positive protection for their heating investment. They'll buy faster and more confidently from *you*, when you offer the plus values of Thatcher equipment . . . backed by *Thatcher's 10-Year Guarantee*. It's one of the many sales features that continue to give Thatcher wholesalers and dealers that extra edge on competition.

Why not make your sales job easier . . . with Thatcher. Get the full story today by writing Thatcher Furnace Company, Garwood, N. J.

Thatcher
FURNACE COMPANY
Specialists in Heating Since 1850

The Oldest Name in Indoor Comfort

is used in the new SANI-FLOR sanitary Closet Base

The Hollaender Manufacturing Company of Cincinnati, Ohio chose MicroRold Stainless Steel for their Sani-Flor closet base to reflect rich beauty and positive sanitation. Sani-Flor is the modern, sanitary, easily installed toilet base made to fit all makes, styles and types of toilets. Whether for homes, offices, hotels, clubs, restaurants, theatres, or wherever floor coverings are used, the Sani-Flor stainless steel toilet base is essential for sanitary reasons. With a Sani-Flor, penetration of moisture and destructive acids around the base of toilets is avoided. Easy-to-clean MicroRold Stainless Steel permanently guards against deterioration and offensive odors. The size of the Sani-Flor is 26″ long and 12″ wide, which is adequate to protect the affected area for both wood and cement floors covered with linoleum, asphalt tile or other composition floor coverings.

The MicroRold base of the Sani-Flor is of one-piece construction with a slight beveled edge which makes a water-proof installation, bridging the joint between the floor covering and the Sani-Flor base.

Can *MicroRold Stainless Steel* be adapted to your product?
Consult our End Use Committee. No obligation.

WASHINGTON STEEL CORPORATION — MicroRold — STAINLESS — SHEET & STRIP

Washington Steel

CORPORATION

WASHINGTON PENNSYLVANIA

PRODUCERS OF *MicroRold* AND VERI-THIN STAINLESS STEEL SHEET & STRIP

For year-round residential air conditioning–

Which do you prefer, single

Heating-cooling engineers disagree!

WHETHER to specify single, or two-stage cooling is a question that has aroused some controversy in the year-round residential air conditioning field.

Many engineers contend that a single-stage system gives satisfactory performance at nominal cost. While others claim that more customers want the features of the two-stage system.

Both sides offer sound reasons for their recommendations (as outlined at the right).

But whichever you prefer—the Honeywell Air Conditioning Control Systems available with single, or two-stage thermostats offer you both.

People who favor single-stage cooling say:

1. Initial cost of installation is more economical.
2. There is less equipment to be serviced.
3. The total unit is more compact.

People who favor two-stage cooling say:

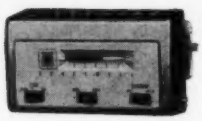
1. Relative humidity is lower and the efficiency of the compressor is increased.
2. There is a smaller current in-rush under starting conditions.
3. By using two smaller units, single-phase wiring can be used where three phase would normally be required.

The flexible Honeywell Control Systems offer your both!

A model for every need. The trouble-free, precision heating-cooling thermostat systems you see on the page to the right, give complete year-round control. Combined with a trouble-free, factory wired control panel; they provide a simple, economical, easy to install control system.

or two-stage cooling?

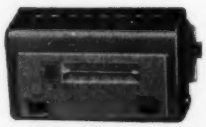
For single-stage cooling



T830A

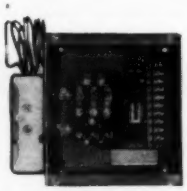
T830 Model A – Finger Tip Changeover. For single-stage heating and cooling with W212 Control Panel. Equipped with one sturdy bi-metal element that handles both heating and cooling. It's fully automatic for heating and cooling with finger tip changeover switch.

T833



T833 Automatic Changeover. If you desire automatic changeover specify the T833 which provides all the features of the T830A plus automatic changeover from heating to cooling. (Notice absence of manual changeover switch).

W212

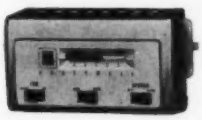


New W212 Control Panel. Extra compact, ultra-versatile—it's universal in its field. Covers a range of compressor sizes from 2 hp to 5 hp single phase and 7½ hp three phase. In a heavy duty or light duty model. Adaptable circuit system lets you customize it to your requirements. And the *complete unit* is covered by a Honeywell one-year guarantee!

For complete details, call your Honeywell office. Or write—Honeywell, Dept. AA-3-27, Minneapolis 8, Minn.

112 offices across the nation

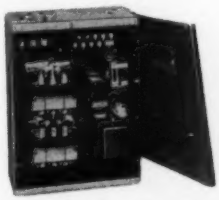
For two-stage cooling



T830B

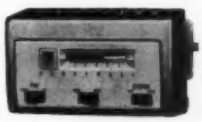
T830 Model B. For single-stage heating and two-stage cooling with the W203B Control Panel. This thermostat is equipped with two bi-metal elements. One for heating and the first stage of cooling and one for the second stage of cooling.

W203B



New W203B Control Panel. This sturdily constructed heating-cooling control panel gives faultless year-round operation. Incorporates accessory terminals for damper motors, cooling tower pumps, solenoid valves, refrigeration pressure controls.

For modernization

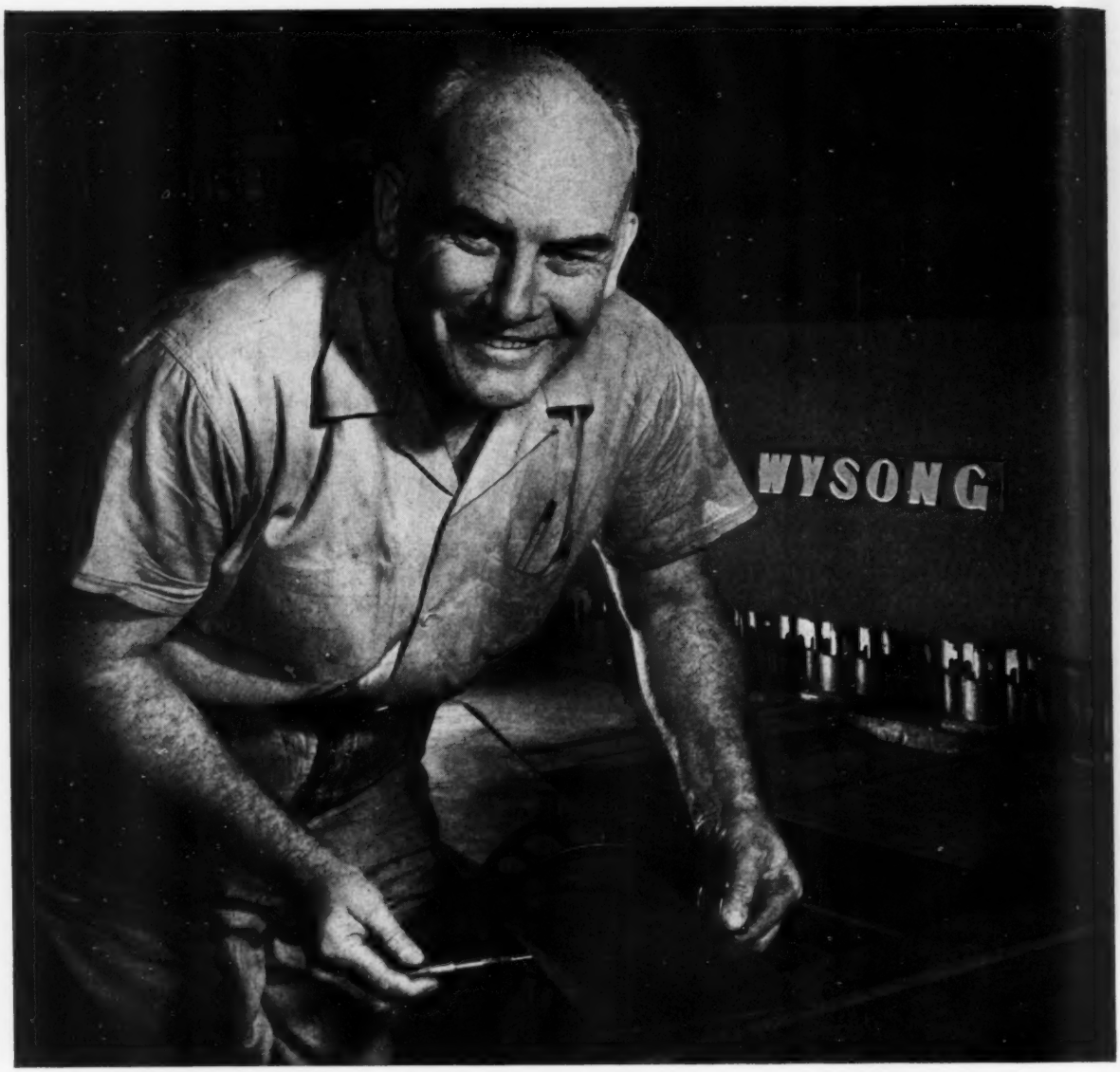


T830C

The T830C is the ideal thermostat for single-stage heating and cooling. Has two bi-metal elements. One for single-stage heating that can control the heating system presently in use. One for controlling the new air conditioning system.

MINNEAPOLIS
Honeywell

Air Conditioning Controls



SHEAR SATISFACTION!

When you use a Wysong, you will know what I mean—a clean, *accurate* cut and complete confidence that the next cut will be just like it.

Wysong Shears are designed and built for that kind of shearing — rugged enough to withstand the shock of capacity shearing, rigid enough to maintain accurate alignment.

You will want to know about the rigid, hi-tensile castings; the drive unit which runs in oil; the non-repeat unit; the positive, compensating holddown; the ball-bearing precision back gauge; and other superior Wysong features. They add up to SHEAR SATISFACTION—for the boss and the operator, too.

Before you buy, investigate WYSONG . . . it's MILES ahead! See your dealer or write factory for new catalog.

WYSONG

WYSONG AND MILES COMPANY • GREENSBORO, NORTH CAROLINA

Builders of Precision Machines For Over Fifty Years.

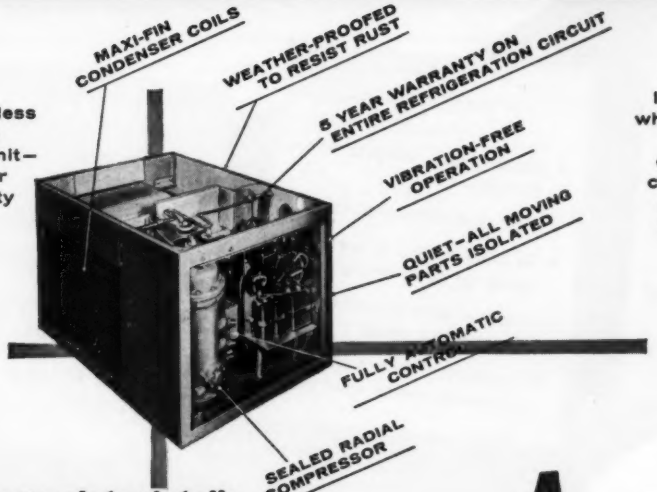
It's easy!

It's quick!

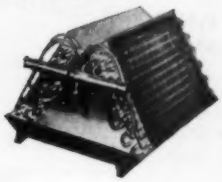
Install heating plus cooling for double profit with the new AIRTEMP Spacesaver combination

Airtemp Furnace (gas or oil) with compact inverted "V" cooling coil mounted on top provides 2 3 of Year 'Round Air Conditioning System; to complete cycle you just add waterless or water-cooled condensing unit—outside the house, in the garage, attic, crawl space or the basement.

Airtemp Waterless (Air-cooled) Condensing Unit—uses only air and electricity



Inverted "V" coil which, installed with Airtemp radial condensing unit, completes system for Year 'Round Air Conditioning



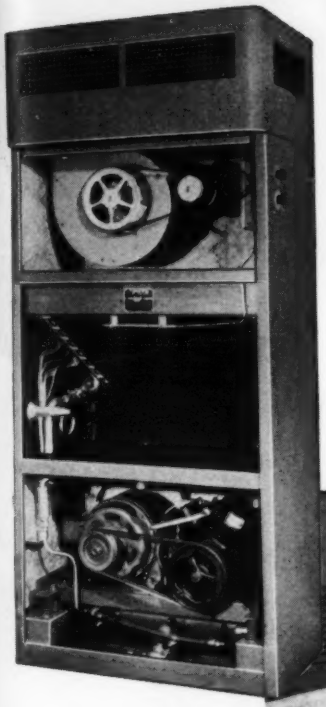
Guaranteed by Good Housekeeping

Write for complete details of today's most profitable heating franchise . . .

Airtemp
DIVISION OF CHRYSLER
DAYTON 1, OHIO

HEATING • AIR CONDITIONING FOR HOMES, BUSINESS, INDUSTRY

TYPHOON uses MICROLITE because



"Microlite gives more acoustical value than any other insulating material"

So say engineering officials of the Typhoon Air Conditioning Co. These men made careful tests of a number of insulating materials before determining that Microlite "gives more acoustical value than any of the others". As a logical result, Typhoon is now using Microlite glass fiber insulation exclusively in their air conditioners.

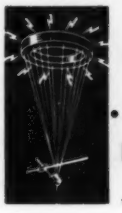
TYPHOON Thinks Silence Is Golden. To keep its air conditioners silent, Typhoon uses three-quarter inch, half-pound density Microlite, which has a sound absorption coefficient of .75 at 1000 cycles (#7 mounting with 10" backspace). Because of its remarkable resiliency and high tensile strength, Microlite does not break down or settle as a result of vibration; thus it always maintains full acoustical (and thermal) efficiency.

And That Isn't All. Microlite is extremely lightweight; is easily cut to any shape; is so soft and flexible it can be readily installed around corners and curves without loss of effectiveness.

MICROLITE Goes Inside Ducts Too. Microlite duct liner is a most efficient, most practical acoustical duct insulation. You simply cut the desired size, adhere it to the metal and form the complete duct section in the brake.

For samples and a folder, write to Glass Fibers Inc., 1810 Madison Avenue, Toledo 2, O.

VITRON Glass Textile Yarns • Rovings • Micro-Fibers
DURAMAT Vapor Barriers • **BLUE FLAG** Pipe Wrap
MICROLITE Thermal and Acoustical Insulation
COUSTIC-AIRE and **THERMO-JET** Aircraft Insulations



GLASS FIBERS INC.

Makers of glass fibers by the ELECTRONIC-EXTRUSION process . . . developed, patented and used exclusively by Glass Fibers Inc.

MORE PROFITS . . . MORE JOBS with Stainless Roof Drainage

You boost profits two ways when you sell and install roof drainage systems made of Armco 17-7 Type 301 Stainless Steel.

First: Every job pays you more because of the higher quality of this durable metal.

Second: Your customers will be better satisfied—and their word-of-mouth advertising will lead to more jobs. The reason is that Armco Stainless Steel needs no maintenance. It will last as long as the building itself. *Yet its cost compares favorably with that of other high-grade metals.*

WITHSTANDS HEAVY LOADS

Stainless roof drainage systems withstand heavy loads of ice and snow without buckling. They harmonize with any building plan or color scheme. When properly installed, they won't discolor or stain adjacent building surfaces. Stainless resists cracking caused by extreme temperature changes. And there is less danger of elbows wearing thin from abrasion.

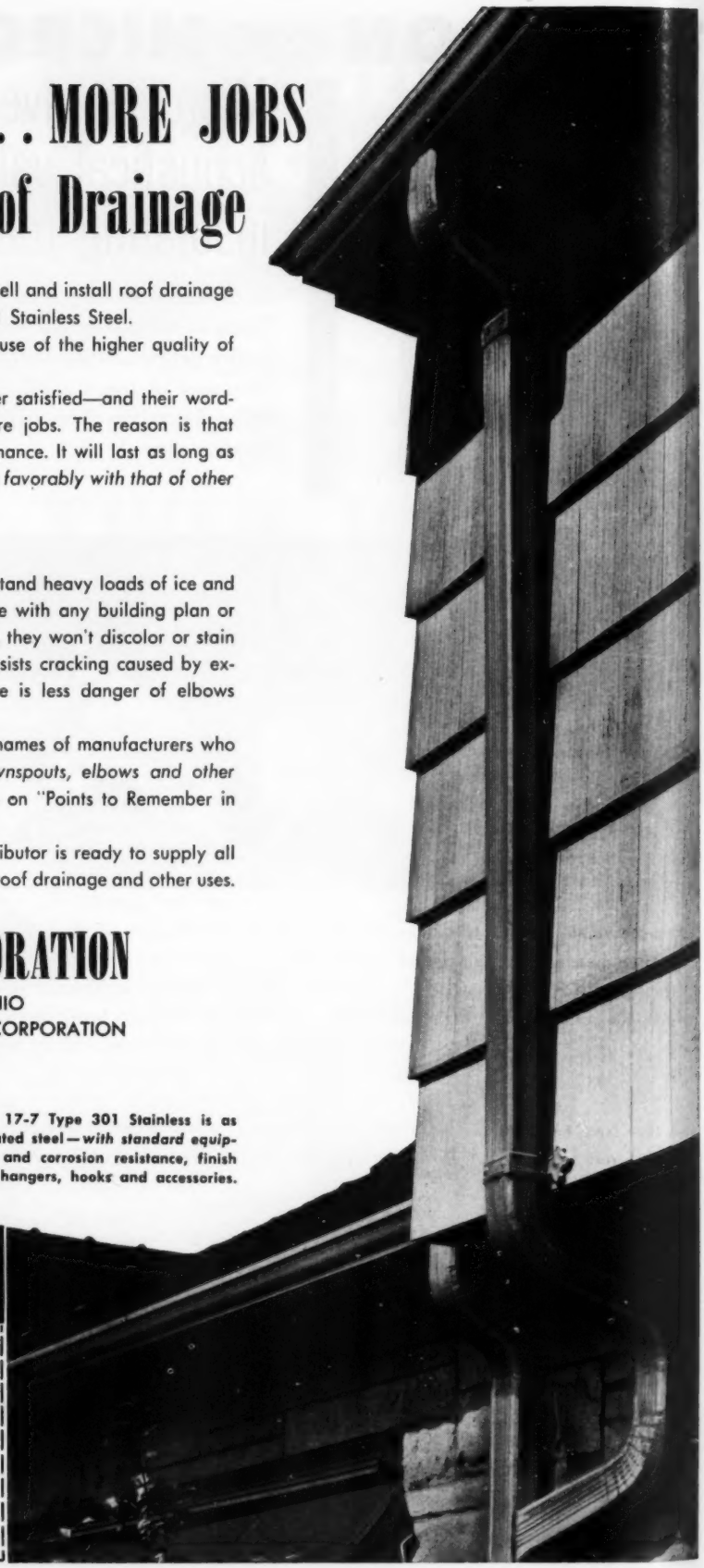
Check and mail the coupon for the names of manufacturers who use this *special-purpose steel for downspouts, elbows and other* accessories. And, send for our bulletin on "Points to Remember in Installing Stainless Roof Drainage."

Remember, your nearby Armco Distributor is ready to supply all the Armco Stainless Steel you need for roof drainage and other uses.

ARMCO STEEL CORPORATION

2224 CURTIS STREET, MIDDLETOWN, OHIO
EXPORT: THE ARMCO INTERNATIONAL CORPORATION

You'll find that 28-gage Armco 17-7 Type 301 Stainless is as easy to work as 26-gage zinc-coated steel—*with standard equipment.* To assure lifetime beauty and corrosion resistance, finish the job with stainless fasteners, hangers, hooks and accessories.



ARMCO STEEL CORPORATION
2224 Curtis Street, Middletown, Ohio

☐ **Tell me who makes stainless roof drainage parts.**

☐ **Send bulletin about installing stainless roof drainage.**

NAME_____
COMPANY_____
STREET_____
CITY_____ ZONE____ STATE_____

DEMAND

FAIL-SAFE PERFORMANCE!

- Reliable — Simple design
- Smaller, lighter, more compact
- Powerful solid FAIL-SAFE liquid fill
- Flexible capillary — various lengths

- Adjustable fan cutout
- Mounts, operates in any position
- For either line or low voltage circuits
- Available without case and cover
- Mounts flush

You specify with Confidence . . . *when you specify Perfex.*

NEW

PERFEX SERIES 480 REMOTE BULB, LIQUID FILL

COMBINATION FAN & LIMIT CONTROL

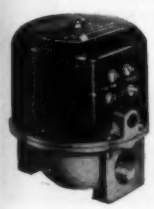
WITH SINGLE ELEMENT

Proven **FAIL-SAFE performance is assured with the Perfex Combination Fan and Limit Control, designed to meet the needs of any forced warm air system installation. Its single thermal element actuates both fan switch and limit switch. By every standard the Series 480 is the finest — you can *depend* on Perfex engineering and quality. Write for complete literature.**

480-C

PERFEX CORPORATION, Milwaukee, Wis. • In Canada: Perfex Controls Ltd., Guelph, Ontario

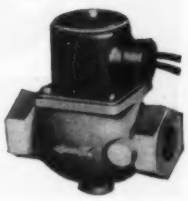
• Automatic Controls for Heating, Air Conditioning, Appliances • Industrial Cooling Radiators • Heat Transfer Products • Coils for Refrigeration and Air Conditioning •



SERIES 3600
DIAPHRAGM
GAS VALVES

SERIES 175
MAGIC DIAL
THERMOSTAT

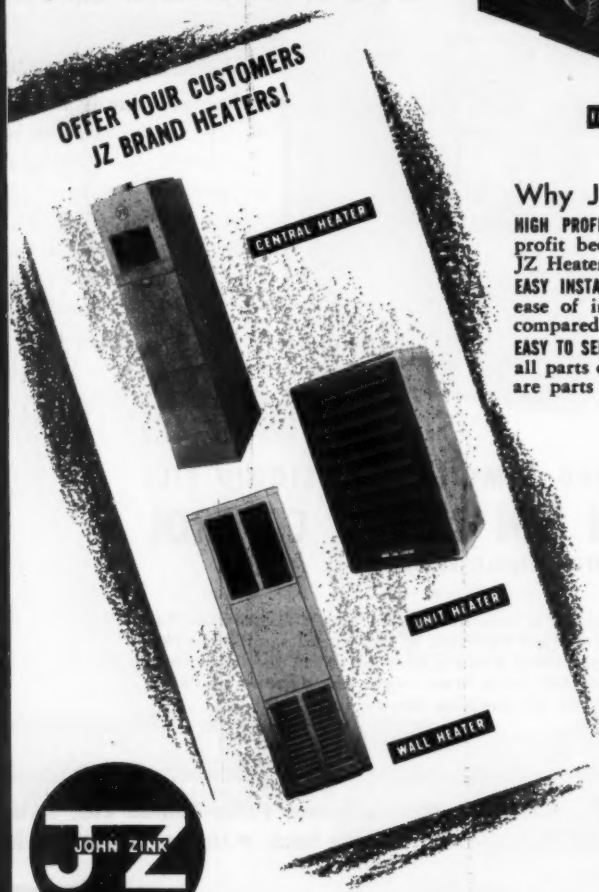
SERIES 3500
MAGNETIC
GAS VALVE



Sell More Heaters

THERE IS A JOHN ZINK HEATER FOR EVERY HEATING NEED

Prospects don't walk away when you show JOHN ZINK Heaters — they buy! For both home and industry JZ Heaters offer customers just what they need in heating: automatically controlled even heat, fuel economy, utmost safety, and quiet operation. JZ Heaters are available in four popular models and many sizes—upright or horizontal CENTRAL HEATERS, louvre or radiant WALL HEATERS, UNIT HEATERS and FLOOR FURNACES. All JZ Heaters are AGA approved for natural, mixed or LP Gas.



Why JZ Heaters Are Money Makers

HIGH PROFIT — JZ Heaters bring a high margin of profit because less time is spent selling customers. JZ Heaters almost sell themselves.

EASY INSTALLATION — JZ Heaters are known for their ease of installation, takes only a short time when compared to other heating units.

EASY TO SERVICE — While compactly and sturdily built, all parts of a JZ Heater are easily accessible. Rarely are parts replacements needed.

JZ Heaters in Four Popular Styles

FLOOR FURNACES. JZ gas fired floor furnaces are available in five conventional and short models with input ratings from 30,000 B.t.u/hr. They become a complete one-package heating unit when equipped with safety pilot and automatic temperature control.

CENTRAL HEATERS. Available in Vertical or Horizontal forced air models. Can be installed in attic, closet, basement, utility room, under the floor, or as a suspended unit. From 65,000 B.t.u/hr.

UNIT HEATERS. Model UHS Gas-fired, fan type suspended heater. Completely automatic. Available in two styles, attractively finished, quiet, safe and easy to install. From 44,000 B.t.u/hr.

WALL HEATERS. WH-25 Recessed Wall Heater fits standard 2" x 4" stud partitions on 16" stud centers. Barely 58" high. Available in standard or radiant styles.

Write For Free Literature

JOHN ZINK COMPANY

4401 South Peoria Tulsa 5, Oklahoma

Sheets and strip?

All the types and sizes you want are here . . . ready for quick delivery to YOU

Because of the exceptionally large, ready-to-deliver stocks of dependable USS quality sheets and strip at each of our modern warehouses, we can supply you—without delay—with the type you want, in the grade and gage you want. (Even on your extra rush orders.) All the steel you order from us has been properly stored and carefully handled and bundled for shipping. It arrives in good, clean condition, ready for fabrication when you get it.

Accurate cutting on our modern equipment keeps tolerances to a minimum, reduces scrap loss. Each order is checked before it leaves the warehouse so you're certain of getting exactly what you specified.

Buying *all* your steel from one reliable source like U.S. Steel Supply saves a lot of time, trouble—and money. We are just as anxious to serve the smallest customer as the largest. Call us first next time you need sheets or strip . . . a little or a lot, common or hard-to-meet specs.

U. S. STEEL SUPPLY

DIVISION

General Offices
208 So. La Salle St., Chicago 4, Ill.

Warehouses and Sales Offices Coast to Coast

UNITED STATES STEEL

Call U. S. STEEL SUPPLY for ALL your steel needs...

Structural Shapes
Plates
Bars—Hot and Cold Finished
Sheets and Strip
Alloy Steels
Stainless Steels
Tubular Products
High Strength Steels
Aluminum
Industrial Supplies and Machinery
Reinforcing Bars, Wire Fabric
Floor Plates, Industrial Flooring

USS STEEL — UNITED STATES STEEL

SEE The United States Steel Hour. It's a full-hour TV program presented every other week. Consult your local newspaper for exact time and station.

Free . . . **Our Latest Stock List**

Contains everything you will want to know about our huge stocks. Tells what is available through our warehouse nearest you. All data is specific, complete, accurate—and easy to find. Send today for this big, all-new Stock List.

U.S. Steel Supply Division, Dept. 435
208 So. La Salle St.
Chicago 4, Illinois

Gentlemen:
Please send me, without charge, your latest Stock List.

Name .....

Company .....

Address .....

City ..... State .....

STANDARDIZATION

OF ALL AAF 2" UNIT FILTERS

SPEEDS SALES — SIMPLIFIES INVENTORY

DESIGN C. Basic filter cell without handles for use in air handling devices which provide necessary supporting members for filter. Pre-fabricated die-cuts on each side are for attaching bail handles.

DESIGN A. Shows basic cell with bail handles attached, universal frame. Note spring latch on frame at right.

HERE'S the "grass roots" solution to making on-the-spot deliveries of unit washable filters to meet varying customer requirements:

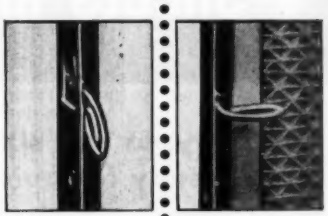
FIRST. Standardization of all AAF 2" unit washable filters—Types HV, M/W and A/C—at ½" under nominal size.

SECOND. *Universal frames* that fit any filter in the line.

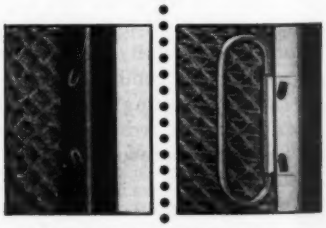
THIRD. Easily attached *spring latches* that lock any filter into universal frame.

FOURTH. *Bail handles* that can be quickly fastened to any AAF permanent filter cell.

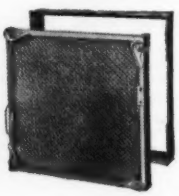
With a stock of the above, you have all the equipment needed to "custom-tailor" in your own shop the right type of filter for any 2" installation requirement. For complete information, call your local AAF representative or write us direct.



Spring latches are quickly inserted in die-cut in universal frame. A screw driver is the only tool needed. Then a "twist of the wrist" locks filter securely in place.



Closeup of cell side showing pre-fabricated die-cut tabs for attaching bail handles. Handles are easily attached by punching tabs through rectangular openings in bail handle hinge.



DESIGN B. This cell, equipped with factory-installed corner latches, is for use where a greater degree of custom-fitting is desired. Its size has been standardized to fit universal frames.

AAF herman nelson

American Air Filter
COMPANY, INC.

American Air Filter of Canada, Ltd., Montreal, P. Q. • 355 Central Avenue, Louisville 8, Kentucky

sures on both line and low voltage. Valves are available in automatic reset and manual reset types and come unassembled in three basic subassemblies. Valves feature a resilient mounted coil, sound-deadening cover, compression spring closing, and soft seat construction providing quiet operation, the manufacturer states. Valves are available in ½, ¾ and 1 in. sizes with capacities of 340, 450 and 775 cfh. They may be used with all gases and with direct current or 115 v, 60 cycle alternating current.

Heat Control-Clock Radio

"MUSITHERM" heating control which automatically lowers and raises house temperature and turns the radio on and off — General Electric Home Heating & Cooling Dept., 5 Lawrence St., Bloomfield, N.J. At

a predetermined time in the morning, the control automatically turns on the heat and at the time desired will awaken the sleeper with music. Control is connected with the existing heating controls by low voltage wiring, is set like an alarm clock by pushing the button before going to bed.

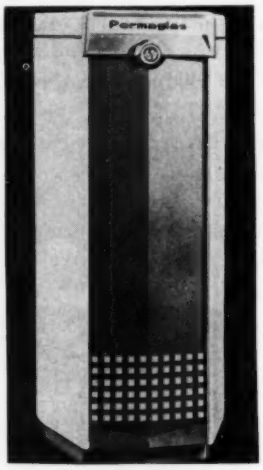
Room Air Conditioners

ROOM AIR CONDITIONING units of 1/3, ½, ¾ and 1 hp featuring "hideaway" installation — Carrier Corp. 300 S. Geddes St., Syracuse 1, N.Y. Units can be installed in any one of 14 different ways. Casing and structural elements are made of bonderized, zinc coated steel. Condenser coil is dip-coated with corrosion resistant paint. Compressor and fans are muffled; compressor is hermetically sealed, fans are dynamically balanced and motors are permanently lubricated. Units from ½ hp up are equipped with factory installed thermostats; window model thermostats have wide range of settings. Controls may be set to provide ventilation with outside air and circulation and filtering without cooling and dehumidification.

equipment developments

Water Heaters

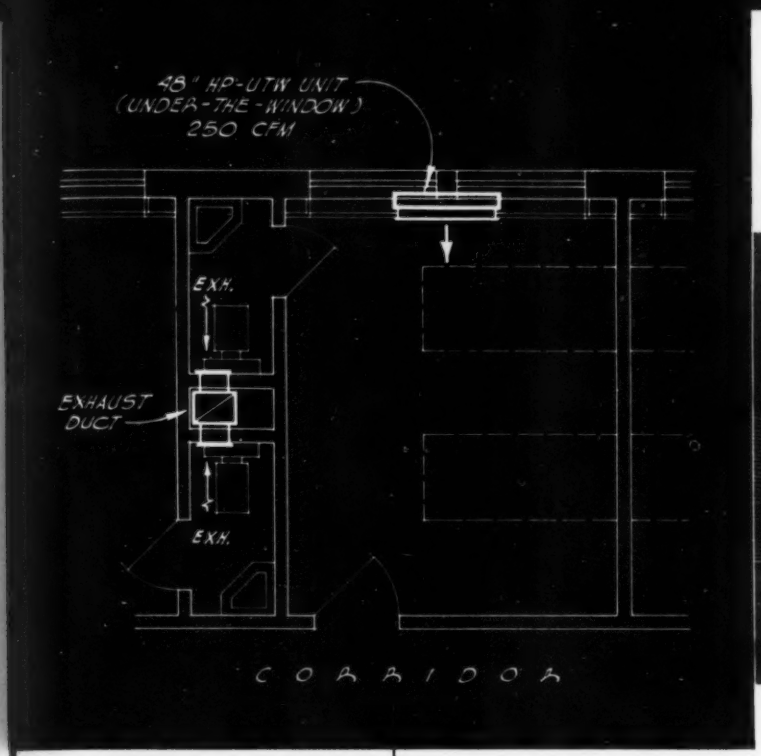
RESTYLED GAS and electric water heaters with rectangular shape, colored front panel and eye level controls — Permaglas Div., A. O. Smith Corp., Kankakee, Ill. Gas models are in 30, 45 and 65 gal sizes ranging



from 33,000 to 60,000 Btu input; electric models have 50, 66 and 80 gal capacities. New models have flat, pastel-colored front panel designed to harmonize with kitchen or recreation room decor, and sides which taper slightly outward to meet curved posterior; front panel is removable. Tank is conventional round shape. "Eye-high" controls are located on die cast copper hood at top of unit, and connected to controls by semi-flexible armored cable inside flexible tube.

Exhaust Fans

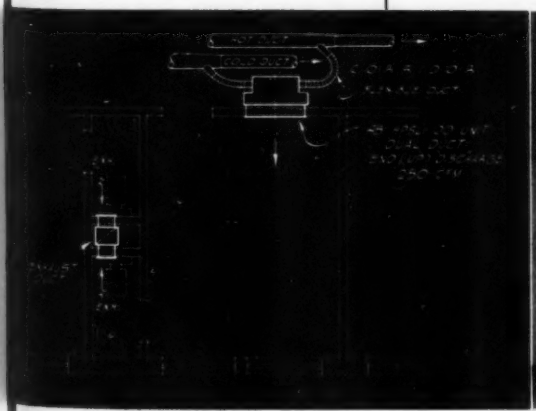
HEAVY DUTY belt drive exhaust fans for use in duct systems of all types — Phoenix Fan & Blower Mfg. Co., 112 S. Eighth Ave., Phoenix, Ariz. Featured are pressure type heavy steel impeller blades matched to a venturi type ring. Heavy steel rectangular panels are said to be easily installed. Reinforced motor mount has adjustable base. Steel shaft is mounted in self-aligning bronze bearing pillow blocks. Panel, brackets and venturi ring are finished in hammertone gray enamel. Fans are available in sizes from 3400 cfm to 10,400 cfm with or without motor.



All-air high velocity units for **hospital air conditioning**

In successful use in many hospitals throughout the country, Anemostat HV round, square and straight line units are adaptable to a wide variety of architectural designs. Diagrams and photographs show typical applications of straight line units.

The All-Air High Velocity system of draftless air distribution offers many important advantages for hospital air conditioning. High velocity units, used with smaller than conventional ducts, save space and money. They substantially reduce sheet metal required, can be installed faster, with less labor. Since there are no coils in All-Air HV units, clogging and odors are eliminated. They operate entirely with air processed in the main equipment room; no fans, filters or electric motors are needed with All-Air HV units.



• ***For latest data on All-Air High Velocity units,*** write on your business letterhead for ***new Selection Manual 50*** to Anemostat Corporation of America, 10 E. 39 Street, New York 16, N. Y.

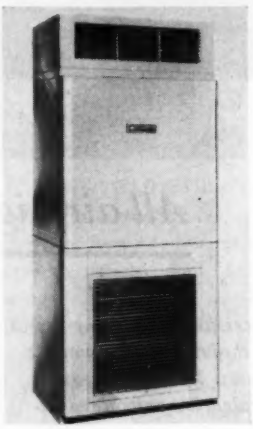
equipment developments

Portable Press Brake

"WONDER-BENDER" press brake which can be carried in regular work kits — Elgen Mfg. Corp., 41-34 39th St., Long Island City 4, N.Y. Unit is 23 in. long, weighs 12 lb; bends steel, iron, aluminum, brass, copper etc. to any desired shape; bends flat bars up to 3/16 in. × 2 in.; also bends rods up to 3/8 in. diameter.

Air Cooled Condensing Unit

CONSOLE refrigeration units which are designed to provide space or duct type cooling, dehumidifying and air filtering for present warm air furnace installations — Williamson Heater Co., 3500 Madison Rd., Cincinnati 9. The base unit is designed for addition to forced air furnaces with adequate blower. For a gravity system or a forced air system where the blower capacity is inadequate, the blower unit is added. The base unit with the blower can also be connected directly to a duct system. Space cap converts the air cooled unit into a space unit. Located outdoors, the unit contains compressor, condensing coil and fan, receiver, dual pressure control and sight glass.



Backward Curved Blowers

NON-OVERLOADING centrifugal blowers with backward curved blades — Hartzell Propeller Fan Co. Div., Castle Hills Corp., 1025 Roosevelt Ave., Piqua, O.

Why you can do it better with Bethcon

Bethcon galvanized sheets are the result of Bethlehem's search for a better zinc coated sheet than is possible with the ordinary hot-dip process. The Bethcon coating is applied by continuous galvanizing. Based on years of research, Bethcon sheets are a great advance over ordinary galvanized sheets, and solve many problems for sheet metal users.

TIGHTER—the Bethcon coating is more adherent and holds tighter to the steel. This means the coated sheet will take severe drawing or forming without flaking or peeling.

MORE UNIFORM—the zinc is distributed evenly over the entire Bethcon sheet. The center, the edges and the ends of each sheet get equal coating, equal protection. The heavy zinc bead usually found on the drip end of an ordinary galvanized sheet is eliminated.

BETTER LOOKING—the spangles on Bethcon sheets are bright, uniform and attractive in appearance.

You can get Bethcon sheets either in cut lengths or coiled strip, 16-gage or lighter. Either plain carbon steel or Beth-Cu-Loy (copper-bearing) steel can be used for the base metal, depending on your requirements. For further information, please get in touch with the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

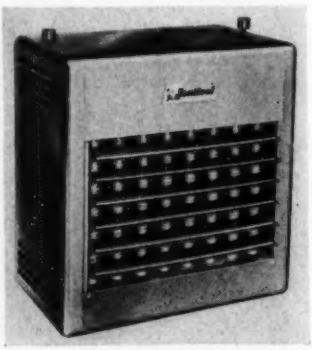
BETHCON CONTINUOUSLY GALVANIZED STEEL SHEETS

equipment developments

Included in the line are twelve belt driven utility blowers. All have arc welded steel frames, heavy gage steel housing and ball bearing construction. Wheels are heavy steel backward curved blades welded to heavy side plates which are bolted to a cast iron hub. Housings may be rotated for any of eight discharge positions at time of installation.

Gas Fired Unit Heaters

MODEL UCS gas fired unit heaters in sizes from 50,000 to 225,000 Btuh capacity — Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., 2375 Dorr St., Toledo 1, O. Acoustical design changes and other changes include improved motor mounting, simplified access for pilot lighting and blue-gray baked enamel finish. Regular ribbon burners, heat exchangers and overheat control are retained.



Electric Ceiling Ventilators

ELECTRIC CEILING ventilators with a combination grille and filter unit designed to screen out grease and dust — Trade-Wind Motorfans, Inc., 5725 S. Main St., Los Angeles 37. Model 2501 which delivers 425 cfm and model 1501 with 300 cfm are optionally equipped with the new filter or with a kit to convert existing models to include the filter combination. Design includes special grille approximately 1 in. deep into which the cleanable metal filter is fitted.

"EASY TO SELL... INSTALL...SERVICE Viking 2300 HUMIDIFIER

Read here why dealers prefer this one model that fits any size furnace, humidifies any size home". That recommendation from Dave Ahern, Viking's New England Representative.

Viking's "2300"

...The Complete Line Furnace Humidifier

For gravity or forced air furnaces of any size . . . with evaporating capacity adjustable to any home.

"One Model That Fits All Plenums . . .

Sure we like that idea. Saves us and our dealers the inventory problem of different size units for different size homes and furnaces. Here we get one model that fills all size plenums and is adaptable to humidify even the biggest homes". **That's what Leslie Algar of Sid Harvey, Inc. in Valley Stream, N. Y. told us.**

"They Simplified Our Installation Problem . . .

All I need is a drill, tin snips and a screwdriver. Viking even gives me a full-size template to help me cut the plenum opening. Only way they could make it easier is to include an armchair for me". **That's what Jim Davis of Mutual Service Co. in Woodmere, N. Y. said.**

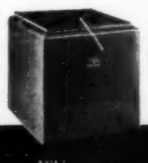
See Your Viking Humidifier Distributor Today!

Order Viking's "2300" Furnace Humidifier and Viking Humidifier Accessories... Float and Valve Assembly, No. 11 Automatic Pan-Filler, Evaporator Plate and Rack.

"Homeowner Services It Himself . . .

My experience with people who have purchased the "2300" proves Viking's claim of simple durable design. The indestructible float is really indestructible. And the servicing information baked on the access plate lets the customer make his own minor adjustments". **Those words of approval from Joseph Spatz of Home Service Co. in Littleneck, N. Y.**

Viking
Air Conditioning
DIVISION OF THE NATIONAL RADIATOR COMPANY
5601 Walworth Ave. Cleveland 2, Ohio


Viking Blower Packages


Viking Blower Assemblies


Viking Humidifiers

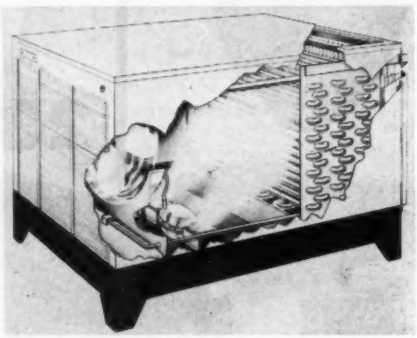
Other Viking Products
Dehumidifiers
Attic Fans
Window Fans

equipment developments

(Continued)

Evaporative Condenser

"AQUA-FOG" evaporative condensing unit which combines water and forced air — Cobell Industries, Inc., P.O. Box 1157, Fort Worth 1, Tex. Heart of the unit is a turbulator which makes rapid heat transfer possible and makes use of small evaporative condensers practical, the company states. Rapid spinning action of the turbulator's dual wheels lifts the water and breaks it into fine multiple sprays; fan forces air over the condenser coils carrying hot refrigerant from the compressor. Rapid heat transfer is effected by reducing the temperature in the fog chamber to a close proximity of the wet bulb temperature of the surrounding atmosphere. Excess water is removed from the exhaust air stream and returned to the water pan by a moisture eliminator.



Translucent Panels

"STEPLAP" translucent glass fiber building panel with heat-blocking ingredient — Alsynite Co. of America, 4654 De Soto St., San Diego 9, Calif. Designed for such outdoor overhead uses as patios, sun porches and car ports, the panel utilizes a heat blocking formula to control light and heat ray penetration. At each lap on the panel there is a 1 in. flat surface flush against the supporting framework for adequate fastening, increased load strength, and permanent structural integrity, the manufacturer reports. Panel is available in standard widths of 41½ in. and 31½ in.; standard length is 10 1/3 ft.

Flush Mounted Air Conditioners

"FRESH'ND-AIRE" flush mounted, push-button room air conditioning units in ½, ¾, 1 and 1½ ton capacities — Cory Corp., 221 N. La Salle St., Chicago 1. Custom series in ½, ¾ and 1 ton capacities has four controls and automatic thermostat which is used as an accessory where desired. Standard series in ¾, 1 and 1½ ton capacities has three controls and optional thermostat accessory. Deluxe series in ½, ¾, 1 and 1½ ton capacities has eight controls and factory installed heater and thermo-

Auer

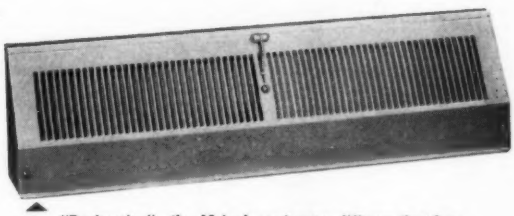
REGISTERS and GRILLES

Fill Every Heating and Air-Conditioning need

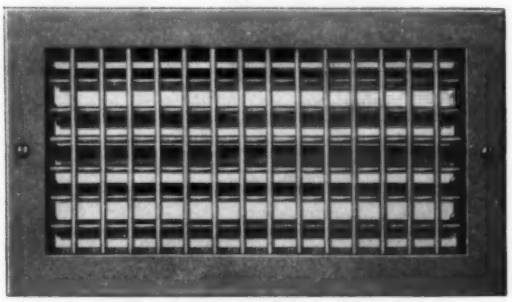
You'll find the answer to all your commercial and domestic register problems in Auer's complete line of registers and grilles. Available for quick delivery in a wide variety of standard styles and sizes to fill the most exacting specifications.

Auer registers and grilles are engineered and built to high standards of uniform quality and accuracy to assure ease of installation with a minimum of on-the-job time loss. They are decorator-designed to enhance both modern and traditional decor while providing the utmost in air-flow efficiency.

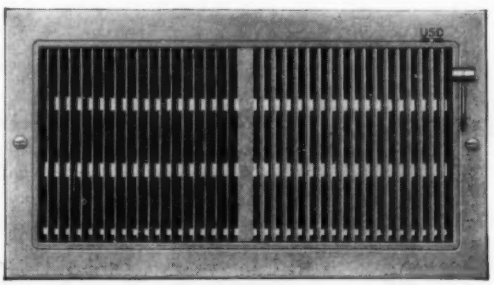
Shown here are a few of the items featured in Auer's "complete-for-every-need" line.



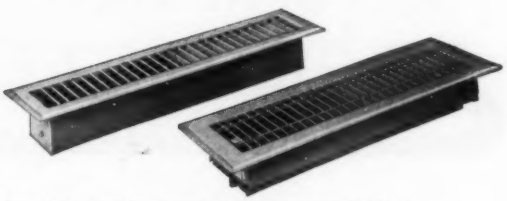
"Perfusaire"—the 18 inch perimeter diffusor that has the capacity of 4 to 8 foot units for heating or air conditioning systems.



The Auer Streamliner series—designed for quiet operation with high velocity air conditioning systems—available with single banks of adjustable bars, vertical or horizontal, also with a double bank, vertical in front and horizontal in back (or the reverse).



No. 4432—Airo-Flex Wall Register—multi-louvres are adjustable to direct air—upward, straight or downward—flexible vertical fins provide right or left deflection for five way control.



Auer DRP Floor Perimeter Registers are available in 2¼ x 14 inches and widths of 4 and 6 inches and in lengths from 10 to 14 inches. Features built-in adjustable damper—attractive appearance and provides large fan-shaped air circulation pattern.

In addition to these items, the Auer line includes ornamental perforated grilles, available in cold rolled or stainless steel, bronze, brass, and aluminum.

Write for complete descriptive literature on Auer's complete line of "Registers and Grilles for Every Need".

Auer REGISTERS and GRILLES

THE AUER REGISTER COMPANY

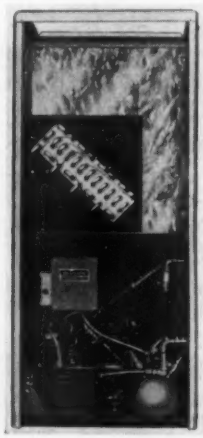
6602 CLEMENT AVENUE • CLEVELAND 5, OHIO

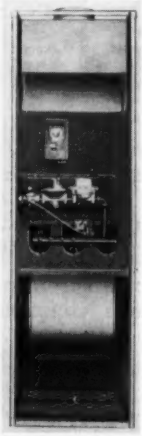
equipment developments *(Continued)*

stat. Units may be installed either flush on the inside of the room, flush with the outside of the building or to any desired position.

Upright Furnaces and Air Conditioners

"PACER" upright forced air gas furnaces and air conditioners — Sequoia Mfg. Co., 1000 Brittan Ave., San





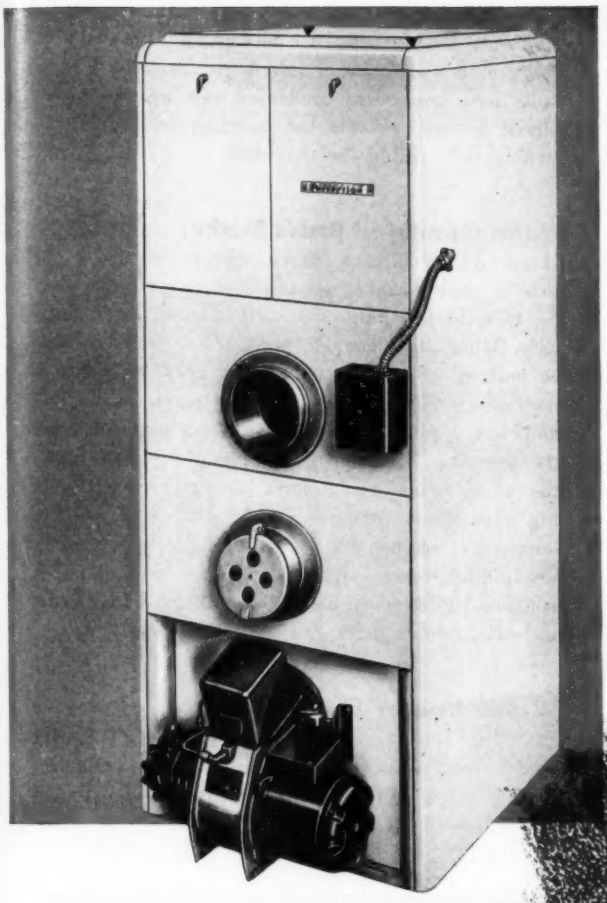
Carlos, Calif. Units have stamped steel slotted burners; large rubber mounted multi-blade centrifugal blowers; and welded steel wafer-section heating element. Filters are standard equipment. Units will be available in 75,000 and 105,000 models, the manufacturer reports. Featured in the new 2, 3 and 5 ton air conditioners is installation flexibility. Evaporator coil component can be installed at the furnace with remote condensing unit or as companion installation with furnace. Both water and air cooled types are available.

Air Cooled Air Conditioner

"AIR-COOL-A-MATIC" air conditioning unit which can be added to present ductwork — Automatic Firing Corp., 4417 Oleatha, St. Louis. Air cooled unit is said to require no additional outdoor equipment such as cooling condensers or other similar installations. According to the company, the unit is rated from 35,700 Btuh at 95 deg to 32,600 Btuh at 115 deg.

Outdoor Condensing Unit

RESIDENTIAL CONDENSING unit designed for remote installation in connection with interior air handling equipment — Brunner Mfg. Co., 1821 Broad St., Utica 1, N.Y. The 5 hp open type unit contains an air cooled condenser with 36,000 Btuh delivery at ambient temperatures to 110 deg, the company states. The 605 rpm compressor features a magnetic starter and disconnect switch; condenser air is supplied by two 1/6 hp fans

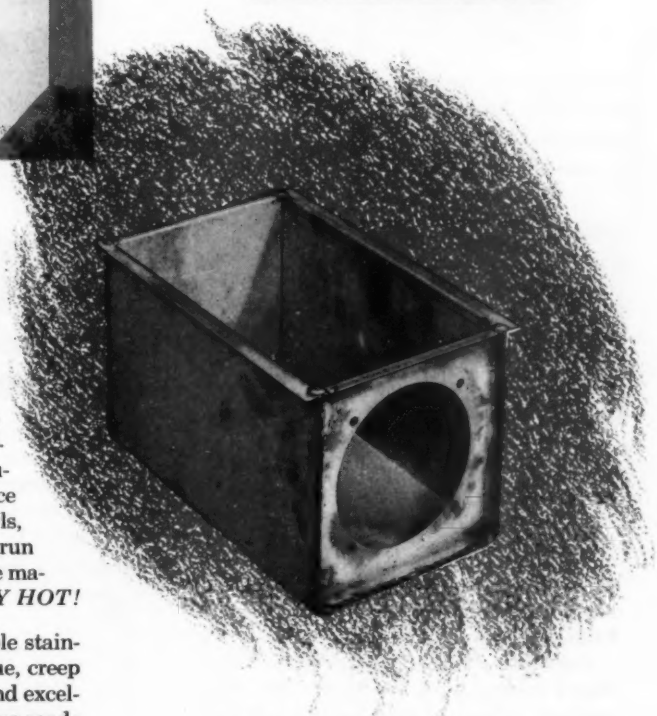


If it's meant to get

HOT

...use

CRUCIBLE STAINLESS



Crucible Type 430 firebox for the Perfection OC 90V Oil-Fired Furnace.

Say *"stainless steel,"* and most everyone thinks of bright appearance . . . corrosion resistance . . . strength without excess weight. But these properties are actually secondary in some applications.

As an example, take stainless steel's remarkable resistance to heat. That's the reason why The Perfection Stove Company uses types 309 and 430 Crucible stainless steels for its gas- and oil-fired furnace components — fireboxes, throat and burner bowls, combustion chambers, and baffles. In the long run stainless is the most dependable and least expensive material they can use for these parts that get *REALLY HOT!*

Of course, in addition to heat resistance, Crucible stainless steels offer corrosion resistance . . . high fatigue, creep and structural strength . . . resistance to wear . . . and excellent workability. And at Crucible, stainless steels are made by specialists who are concerned only with special purpose steels. They welcome the opportunity to help you select the best grade for the job. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

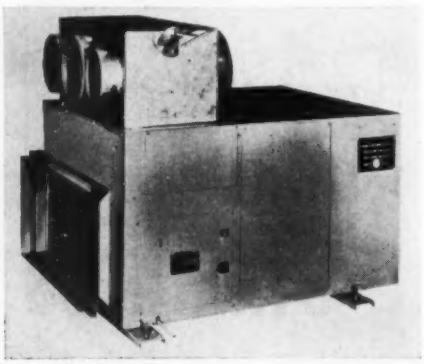
Crucible Steel Company of America

equipment developments *(Continued)*

with 3600 cfm total capacity. Also available are semihermetic condensing units in 1½, 2 and 3 hp sizes.

Air Cooled Air Conditioners

THREE AIR CONDITIONING units in 1½, 2 and 3 ton air cooled models — Affiliated Gas Equipment, Inc., 700 Royal Oaks Drive, Monrovia, Calif. Model 150



ACS (1½ ton) has a cooling capacity of 17,500 Btuh. Models 200 ACR (2 tons) and 300 ACR (3 tons) are semihermetically sealed units. Field maintenance on the smaller model is simplified as the unit is charged, hermetically sealed and tested at the factory before shipment. Models without a blower are also available to be used with existing forced air furnaces. Larger units have compressor-condenser unit which can be placed entirely outside the building with only the cooling coils inside the ductwork.

Hand Operated Press Brake

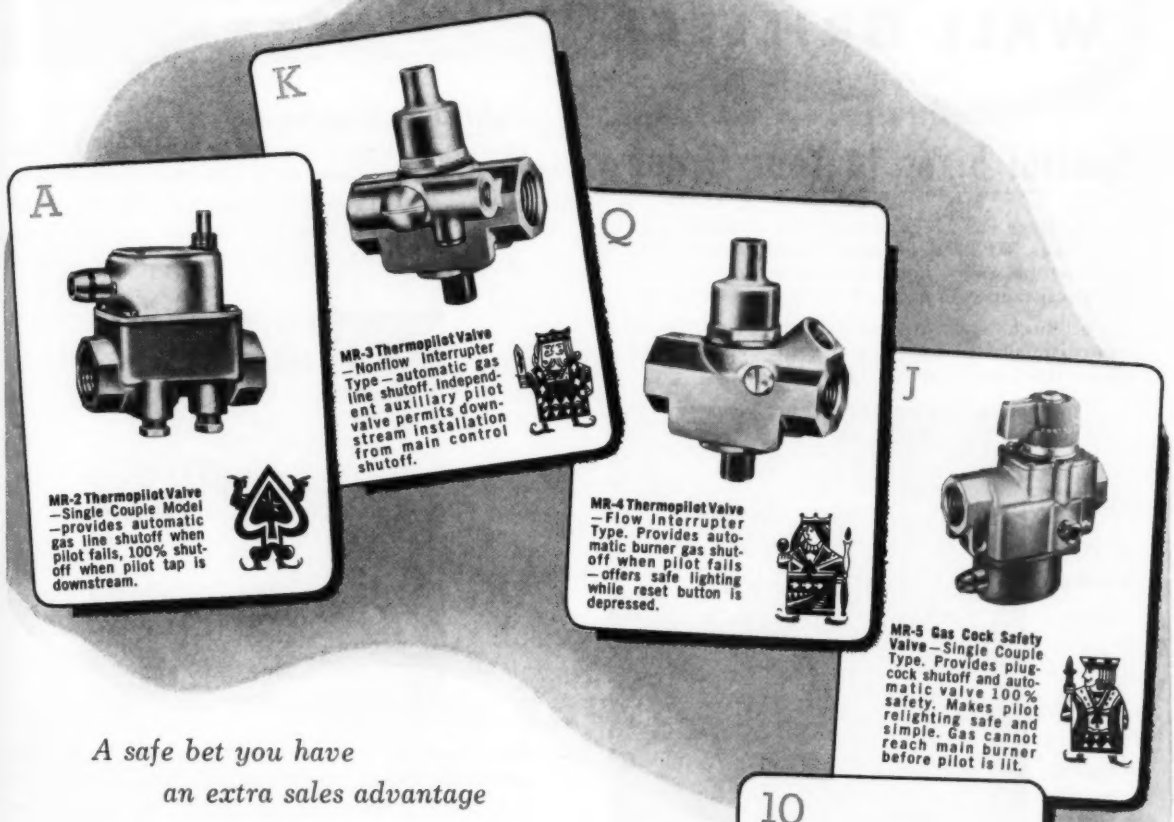
HAND OPERATED press brake said to develop eight tons of pressure and use standard press brake dies — O'Neil-Irwin Mfg. Co., 501 Eighth Ave., Lake City, Minn. Simple angle and radius bends as well as curling, corrugating, flanging, hemming, flattening, punching, blanking, drawing, joggling, channel and box forming operations can be performed on the machine. Designed to accurately duplicate parts, the press brake has a lever operated roller bearing cam which produces ample power for average operations; ratchet drive multiplies this power when forming heavier materials, the company reports. Other features are hardened and ground guides, roller bearing cam, ratchet drive and adjustable back gage.

Water Heater Line

"JETGLAS" redesigned line of standard and master model water heaters with special outside protective coating to prevent rusting of the tank — Affiliated Gas Equipment, Inc., 700 Royal Oaks Drive, Mon-

a SAFE BET

on any gas appliance



A safe bet you have an extra sales advantage

Some people buy for economy. Some want the best at any price. But *safety* rings the bell with everyone!

That means, on any gas appliance, an automatic safety valve is one of your *better* sales features. And when it is General Controls (operating on the proved thermocouple principle)—it's the *best!* Point to the famous General Controls red shield and tell your prospect it is his best assurance of dependable performance—a safe bet for lasting *safety!*

General Controls
MR
SERIES
Safety Shut-off
VALVES

GC 1955 25 YEARS SILVER JUBILEE

GENERAL CONTROLS

PLANTS: GLENDALE, CAL. • BURBANK, CAL.• SKOKIE, ILL. • 38 BRANCH OFFICES SERVING THE NATION

America's Finest Automatic Controls

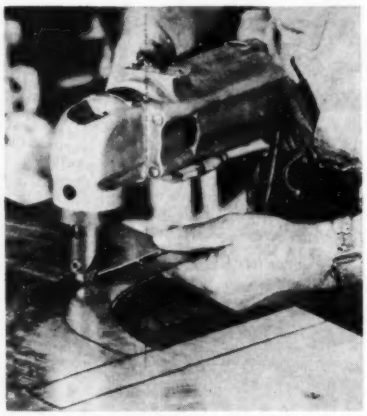
MANUFACTURERS OF AUTOMATIC CONTROLS FOR THE HOME, INDUSTRY, AND THE MILITARY

equipment developments *(Continued)*

rovia, Calif. Brass nipples and a new series of controls and metered anode rods are featured in both lines; master models also feature "Dual-safe" control system employing new thermostat in the conventional position and a high limit control located near the top of the tank. Master line is available in 30, 45, 70 and 100 gal capacities. Standard models are available in 20, 30 and 40 gal capacities.

Light-Duty Nibbler

LIGHT-DUTY NIBBLER designed to handle stainless steel up to 18 gage, milder steels and other sheet stock up to 16 gage — Fenway Machine Sales Co., Inc., 263 N. 23rd St., Philadelphia 3. Nibbler is said to cut all types of stainless steels as well as light plate or

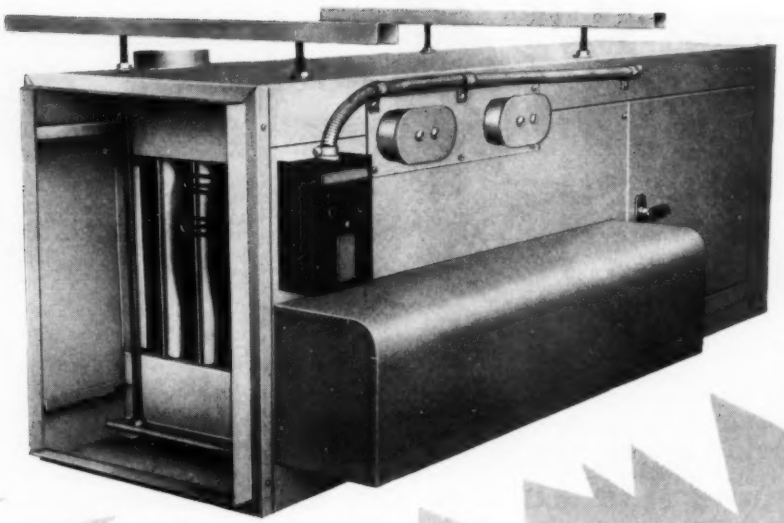


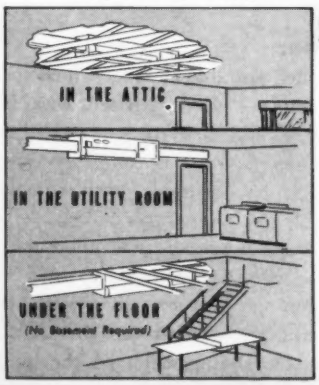
sheet stock of cold-rolled steel, aluminum, copper, galvanized metals, etc. Irregular, rounded or special shapes and contoured stock are cut without damage to the original contour, the company states. Using a punch and die action, the nibbler is used as a hand tool or can be vise-mounted for bench operation. At maximum load it cuts at the rate of 43 in. per minute from any angle, with a minimum cutting radius of 7/8 in. Motor is universal type, and a three-wire, 8 ft. rubber cord is included. Also featured are special interchangeable heads for cutting corrugated metals and a new 90 deg die holder on heavy duty model.

Residential Conversion Units

"CONVERT-TO-COOL" air cooled residential conversion units in 2 and 5 ton capacities — Typhoon Air Conditioning Co., Inc., 505 Carroll St., Brooklyn 15. Cooling coil is installed in the ductwork on top of a standard forced warm air furnace; air-cooled condensing unit can be located anywhere outside the conditioned area. Condensing unit includes a hermetic compressor, air cooled condenser, fan motor and heavy metal cabinet. Featured is a large condensing surface designed to assure full rated capacity under extreme

Announcing the NEW COZY HORIZONTAL FURNACE





SPACE SAVER... MONEY SAVER...

Now you can add another *Cozy* profit-maker to your line... the new COZY HORIZONTAL FURNACE. Let your customers get comfort-fitted for cold weather at low cost... and let them save valuable floor space, too. Installed in the attic, utility room, or under the floor, the COZY HORIZONTAL FURNACE will uniformly circulate clean, filtered, fresh air at the temperature preferred... to every room in the home. And its distribution system lends itself equally well to air conditioning for summertime comfort. It's fully equipped with automatic safety and room temperature controls. Install the COZY HORIZONTAL FURNACE... factory assembled and completely prewired... for luxurious comfort, convenience and economy for your customers and for more satisfied sales for you.

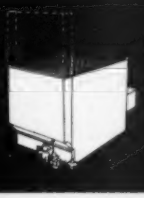
Investigate the complete *Cozy* line of gas-fired furnaces. There's a *Cozy* furnace for practically every home-heating problem... and backed by over a quarter century of experience. *Ask about high-profit, year-around sales plan.*

Cozy Models 200-140 Upflow and 201-140 Counterflow, 140,000 BTU Input Capacities

Cozy Models 201-105 Counterflow and 200-105 Upflow, 105,000 BTU Input Capacities.

Cozy Models 200-75 Upflow and 201-75 Counterflow, 75,000 BTU Input Capacities.

Cozy Wall Heaters available in four capacities and for single or dual installations.



Cozy Challenger Floor Furnace with accessible controls... the best buy in floor furnaces.

COZY

A Product of

The ADVANCE FURNACE CO.

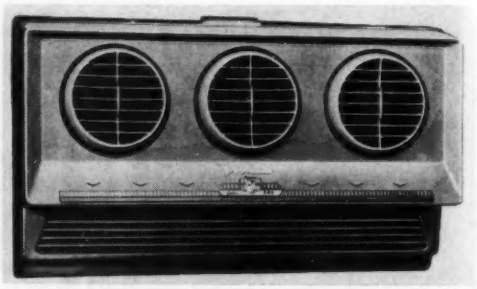
Wichita, Kansas

equipment developments *(Continued)*

temperatures. Fan opening in the condensing unit is equipped with a wire grille; for outdoor application, hoods are available for the fan and coil opening.

Window Air Conditioner

SELF CONTAINED air cooled window unit operating with twin 1 hp systems — O. A. Sutton Corp., 1812 W. Second St., Wichita, Kans. Controls can



be adjusted to run the unit with one compressor when maximum cooling is not needed. Three grilles on the front individually tilt up or down and rotate 360 deg for draft-free air direction, according to the company. Unit will fit any opening 30¼ in. wide and 17⅛ in. high. It can also be mounted through the wall or in casement windows. Other models in the "Vornado" line are available in sizes from ½ to 1½ hp, including a ¾ hp casement window unit.

Portable Hammer

"RAM-EX" self-contained portable hammer which operates on the ram principle — E. V. Nielsen, Inc., 128 Broad St., Stamford, Conn. Requiring no air lines or electrical connections, hammer is completely operated by hand. Chuck has a quick change action to take over 40 tools for chipping, drilling, rivet busting, cutting, sealing, roughing and other operations. Any of three weights may be mounted on the guide rod; impact is produced by sliding the weight down the guide rod against the rear of the chuck holder. Adjustable sliding collet on the guide rod and interchange of different size weights control the impact.

Water Heater Controls

"AQUA-MAID" line of water heater controls featuring wrap around curved shape which permits the control to fit snugly against the curved surface of the heater tank — Appliance Controls Div., Minneapolis Honeywell Regulator Co., 2726 Fourth Ave. S., Minneapolis 8. Units have streamlined top and front reading, gas-cock and temperature-setting dials and safety reset button conveniently located on the top and face.

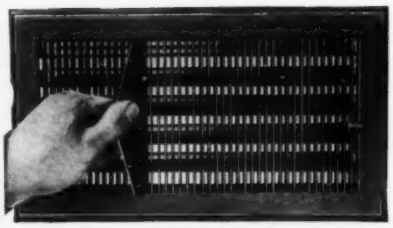
LEADS the PARADE for '55

LATEST IMPROVED REGISTERS and GRILLES For PERIMETER, CONVENTIONAL FORCED AIR and COMBINATION AIR CONDITIONING SYSTEMS

Do not accept Substitutes for the BEST (U.S.). The Most Complete—Highest Quality Lines in the Industry today—Backed by over a Half-Century of constant Improvement and Progressive Development of THE GREATEST LINES ON EARTH.

NEW NO. 1000 U.S. BASE DIFFUSER

The GREATEST Success in the so-called "STRIP BASE" DIFFUSER FIELD. In Six Months Only of 1954 IT SWEPT ASIDE ALL COMPETITIVE LINES. BE SURE TO TRY THEM. INCREASED FACE AREA, REDUCED RESISTANCE, REDUCTION of INSTALLATION COSTS, BEAUTY and UNLIMITED QUALITY FEATURES and LOW COSTS make them the OUTSTANDING BUY of the YEAR. Get our Latest Folder covering the No. 1000 U.S. BASE DIFFUSER.



NO. 256 U.S. AIR CONDITIONING REGISTER

A STANDARD of COMPARISON in the Register Field for Years, Imitated but never Equalled. Costs NO MORE than Imitations so Why Not Buy the Best. The Original FOUR-WAY Flow Line with Bendable Grille Bars—Non Vision. The Line you can Safely Stock and Rely on.

NEW NO. 105 U.S. DIFFUZAIR-SIDEWALL

That ORIGINAL "SUNBURST" PATTERN that Delivers a PERFECT EVEN SUNBURST 180° DIFFUSION unequalled by any other Style. IT'S AMAZING and ASTOUNDING. Does not Scrub Walls. LOWEST RESISTANCE of any Diffusing Sidewall or Base Diffuser.

No. 106 U.S. DIFFUZAIR-BASE (with Head) is the Same SUNBURST DESIGN but is Intended for Out-of-Wall Installations.

Write for No. 55 Catalog—Delayed due to New Line Additions. Will soon be available.

UNITED STATES REGISTER COMPANY

BATTLE CREEK, MICHIGAN

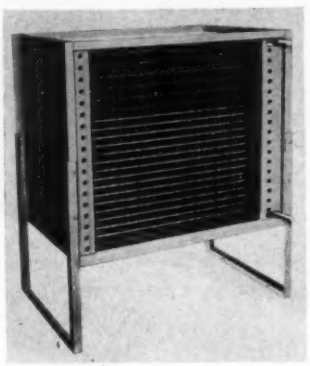
MINNEAPOLIS • KANSAS CITY • ALBANY

equipment developments (Continued)

Three models make up the new line: model V5124 is said to provide 100 percent safety shutoff; V5125 is functionally identical but is equipped with vertical instead of horizontal inlet connections; economy model V5123 does not have 100 percent shutoff. Other features include space-saving straight down main gas and pilot outlets and thermocouple connections which permit shrouding; fully confined gas-cocks; thermo-magnetic pilot safety shutoff. All models have corrosion-resistant metals as well as integral pilot-line filters.

Air Cooled Condenser

"ATMOSTHERM" air cooled condenser designed to derive the maximum cooling effect from air when placed in the yard or on top of flat roofs — Rempe Co., 340 N. Sacramento Blvd., Chicago 12. Unit contains fin coil



with copper tubes and aluminum fins, in weatherproof casing of heavy steel. Construction is designed to eliminate vibration. Headers and return bends are protected and located in air stream. A special section in the coil promotes maximum heat transfer efficiency, according to the company. Unit is available in 2, 3, 5 and 7½ ton models.

Soft Faced Hammers

SOFT FACED HAMMERS said to last as long as mallets of composition, rawhide, rubber, fiber, micarta and lead — Nupla Mfg. Co., 1026 N. Sycamore, Los Angeles 38. "Nuplaflex" does not chip or mushroom, resists petroleum products and common industrial acids, according to the manufacturer. Hammers are said to produce no-sting, no-bounce blow which helps workers accomplish their jobs easier while reducing worker fatigue.

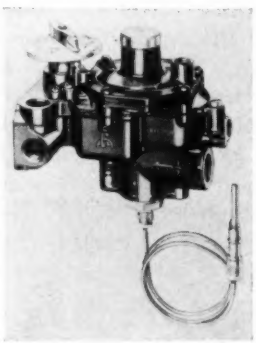
Roof Ventilator

"VERTIFLOW" roof ventilator designed to offer minimum resistance to airflow — Hartzell Propeller Fan

Co. Div., Castle Hills Corp., 1025 Roosevelt Ave., Piqua, O. Unit consists of a galvanized steel windband mounted over base of heavy galvanized steel. Galvanized lids in the windband turn on plastic bearings, opening when the fan is on, closing when it goes off. When lids are open, air stream prevents entrance of rain or snow. Ventilators are available in 18, 24, 32, 36 and 42 in. models, with capacities from 3000 to 26,400 cfm.

Heater Control

"GASAPACK" model 55 heater control designed for modern gas equipment — A-P Controls Corp. 2450 N. 32nd St., Milwaukee 45. Self-contained unit com-



prises five controls including built-in pressure regulator for city gas, large pilot filter, 100 percent automatic pilot and main and pilot shutoffs. Featured are the 55MTS modulating snap thermostat, 55MT modulating thermostat and 55 ET electric thermostat. Unit has a standard thermo-magnetic safety pilot with safety shutoff protection and includes easy bypass or low fire adjustment, the manufacturer reports.

Industrial Stack Cap

STACK CAP designed for use in industrial exhaust systems with conveniently located fan or blower — Hartzell Propeller Fan Co. Div., Castle Hills Corp., 1025 Roosevelt Ave., Piqua, O. Cap is a 20 gage steel band mounted on an angle iron ring which bolts to a similar ring on the end of the vent. Two galvanized lids in the windband are mounted on a brass rod which turns in plastic bearings. Lids open automatically when the system is operating, close tight when the fan goes off. When the lids are open, the air stream prevents entry of rain or snow. Stack cap is available in 11 sizes, 12 to 48 in. diameters.

Rust-Resistant Room Cooler

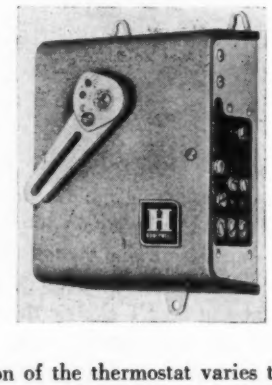
WINDOW-TYPE room air conditioner featuring aluminum base pan and other aluminum structural parts —

equipment developments *(Continued)*

United States Air Conditioning Corp., 3300 Como Ave. S. E., Minneapolis 14. Produced in ten models of ½, ¾ and 1 ton cooling capacities, units are of glass fiber and aluminum construction designed for structural strength, lighter weight and improved sound and thermal insulation, the company reports. Inside cabinet extends less than 2 in. into most rooms. Control panel is beneath a hinged front panel; deluxe models include push-button selection of six operating positions, automatic thermostat and outdoor air and exhaust controls.

Damper Actuator for Zone Heating

MODEL M829A noiseless damper actuator designed to give a modulating effect from standard two-wire thermostats — Minneapolis-Honeywell Regulator Co., 2726 Fourth Ave. S., Minneapolis 8. Engineered for residential warm air zoned heating systems, the unit consists of a bimetal coil fastened to the shaft. The



cycling action of the thermostat varies the amount of heat applied to the bimetal element causing shaft to rotate slowly in proportion to heat demands of the zone thermostat. Installed in a modern zoned home, units can be controlled by systems which use indoor and outdoor thermostats to regulate temperatures in major occupancy areas of the house, by electric clock or semi-automatic thermostats for bedrooms where night setback is desired, and by the round thermostat in intermittent-occupancy areas where manual setting is acceptable for motorized damper operation.

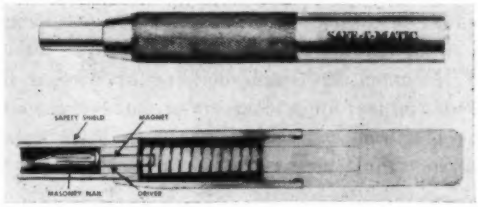
Reset Thermopilot Relay

MODEL A-100R thermopilot relay designed for automatic safety shutoff of gas fired appliances — General Controls Co., 801 Allen Ave., Glendale 1, Calif. According to the company, the unit features automatic reset and stable operation with vibration chatter eliminated by the use of Model G-250 pilot generator. Current generated closes the electrical relay switch; when pilot flame is low, the relay breaks contact to shut off the main control valve. Relay contact

is automatic — no manual reset is required, the manufacturer reports. Relays are available with either two-wire or three-wire connections. Operating mechanism is enclosed in a transparent, dust-sealed case. Terminals are marked for installation.

Masonry Nail Driver

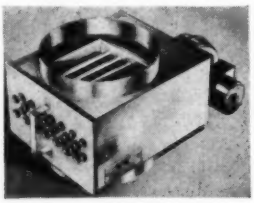
"SAFE-T-MATIC" nail driver for driving masonry nails into concrete, cinder blocks, concrete blocks, light and medium gage metals — Safety Nail Driver Corp., 70



Rosalie Ave., Clifton, N.J. The tool features a built-in permanent magnet which holds ½ to 1⅛ in. nail in position, and a sliding safety shield which is said to cut working time and eliminate danger of flying nails. Nails driven with the driver have strong holding power and do not require use of star drills, plugs and screws, according to the company.

Chimney Heat Exchanger

"ECONOMIZER" home heat exchanger said to convert up to 50 percent of chimney heat losses into usable heat — Norse Boiler Co., Stelton Rd., New Market, N.J.



Unit works air to air, taking heat from hot chimney gases, blowing cool air through the hot coils, warming and dispersing it while allowing cooler chimney gases to pass out. Simple to clean, the unit has only one moving part and is claimed to have enough capacity to provide heat for a large room.

Versatile Application Blower

UNIVERSAL DUCT BLOWER and attached blower motor mounted in resilient glass fiber shock mounts at its own center of gravity — Viking Air Conditioning Div., National Radiator Co., 5601 Walworth Ave., Cleveland 2., O. Adjustable shock mounts support the blower in any standard discharge position and are impervious to oil, grease, heat, moisture and dirt,

equipment developments *(Continued)*

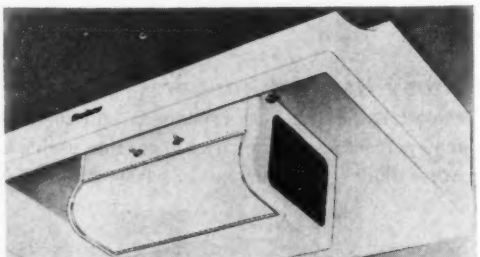
according to the company. Blower can be installed in ducts horizontally or vertically to discharge heat from a duct heater, to draw air through a return air duct, to force air through a duct heater, or draw cool air through the evaporator coils of a downdraft cooling system. It is adaptable to basement, attic or crawl space ductwork and does not have to be attached to the heating unit.

Room Air Conditioners

"CONSOLAIRE" room air conditioners designed for window or through-the-wall installation — Remington Air Conditioning Div., Remington Corp., Auburn, N.Y. Mounted flush with building or window line, the unit adjusts up or down, in or out. Self-contained air cooled unit is suitable for room by room installation, the manufacturer reports.

Ventilating Hood

MODEL 400 ventilating hood with twin-wheel blower — Stanthony Corp., 5341 San Fernando Rd. W., Los Angeles 39. Twin-power blower is installed within the hood for utility of the cabinet space above the



range and for better ventilation, the company reports. Unit has a center discharge using standard $3\frac{1}{2} \times 10$ in. furnace duct. Blower housing has a built in light fixture and twin filters. Housing is hinged for easy access to the filters, lamps and blower unit; automatic switch shuts off current when housing is opened. Available in 36 to 48 in. widths, unit is in two styles.

Cooling Tower Line

INDUCED DRAFT and atmospheric cooling towers — United States Cooling Tower Co. Div., Heatcraft Co., 414 W. Main St., Louisville, Ky. Induced draft models are in two to 50 ton sizes; atmospheric models are three to 20 ton sizes. All models have rubber asphalt finish inside and outside with high gloss aluminum exterior finish. Front and back drift eliminators, rear service door are other features. Redwood or asbestos decking is available.

new literature . . .

Cooling Towers

SERIES "33" cooling towers are illustrated and described in bulletin 33-104-55 (four pages) — Havens Structural Steel Co., 1713 Crystal Ave., Kansas City, Mo. Included are specifications and dimensional and technical data for models ranging in capacity from two to 15 tons.

Room Air Conditioning Units

ROOM AIR CONDITIONERS in ¾ and one ton sizes with cooling capacities of 8000 and 11,500 Btuh are described in a four page, full color folder (Unit X7921) — Emerson Electric Mfg. Co., 8100 Florissant Ave., St. Louis 21. Features include color panels supplied in six colors which may be changed to harmonize with home and office furnishings, five adjustable louvers, and double power exhaust. Temperature controls are standard on 1 hp models, optional on ¾ size.

Custom Built Folder Brakes

ILLUSTRATED CIRCULAR (four pages) presents data on single and double wing folder brakes — Dreis & Krump Mfg. Co., 7400 S. Loomis Blvd., Chicago 36. The brakes are custom built, designed to meet individual requirements for length of bend, distance between bends, sharp or radius bends with or without flanges, offsets or beads.

Home Heating and Air Conditioning

BOOKLET L233 (12 pages) gives model and specification information on residential air conditioning and heating equipment — Airtemp Div., Chrysler Corp., 1600 Webster St., Dayton, O. Included is data on waterless and water cooled year 'round units, gas or oil fired basement, vertical and counterflow furnaces and gas fired horizontal furnaces.

Advertising Electronic Air Filters

EIGHT PAGE BOOKLET entitled *Advertising Guide* was prepared to help dealers coordinate and use various kinds of advertising material promoting electronic air filters — American Air Filter Co., Inc., 355 Central Ave., Louisville 8. Sections of the book deal with newspaper advertising, radio, television, direct mail, displays and publicity.

Gas Fired Warm Air Units

SERIES "G" gas fired forced warm air units are described in a two page illustrated circular — Herco Products, 131 Locust St., Lancaster, Pa. Specifications are included for highboy, counterflow and lowboy models. Also illustrated and described is the unit's

new literature *(Continued)*

"deep corrugated" heat exchanger developed to provide maximum heating efficiency without sacrificing compact design.

Pulleys and Belts

DATA SHEET covers "Zatko" one-piece and variable pitch pulleys — Replacement Parts Inc., 22408 Lake Shore Blvd., Euclid 23, O. Information is also presented on fractional hp and replacement belts.

Air Filters

FOUR PAGE FOLDER describes "Aerosolve" filters designed for high efficiency air filtering in commercial air conditioning systems — Cambridge Filter Corp., 738 Erie Blvd., E., Syracuse, N. Y. Also being offered is an eight page booklet containing data on the "Absolute" filter designed for applications requiring essentially particle-free air.

Registers and Grilles

CATALOG NO. 6 contains information on grilles, registers and diffusers with and without directional vanes — The Louvra Corp., 1010 Jeanette Ave., Union, N. J. Featured is the sponge rubber gasket furnished as standard equipment on all wall type air conditioning registers except intakes. All registers and grilles have standard metal prime finish. Information is also presented on adjustable horizontal and vertical louvers. Also available is a circular illustrating and describing "Vane-O-Line" strip supply grilles. The unit has a depth of 1¾ in. and a ⅝ in. face flange, is offered in two types — 12, 18 and 24 in. complete sections or 12 in. end and adjoining sections which may be assembled into a continuous unit of any length.

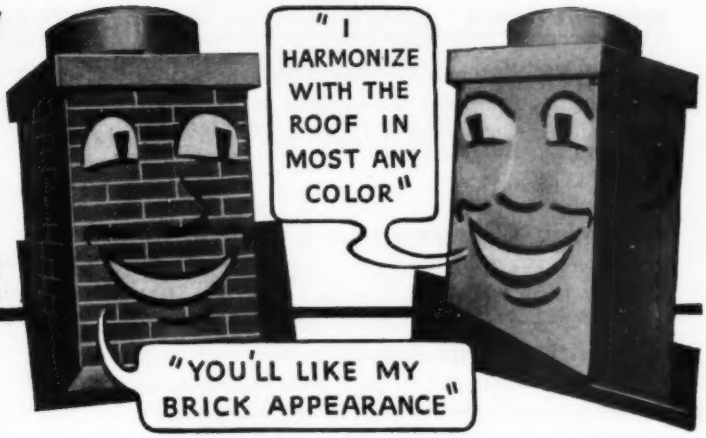
Noise Control for Air Conditioning

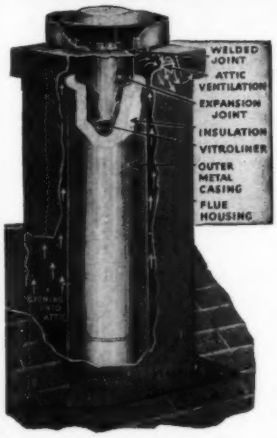
TWENTY PAGE booklet illustrates and describes "Aircoustat" packaged units for silencing air conditioning systems — Industrial Sound Control Inc., 45 Granby St., Hartford, Conn. Included is an analysis of noise control design procedures, a description of the unit and its development, specifications on models and styles available and a four-step outline of how to solve air conditioning noise problems.

Utility Blowers

DIMENSIONS, specifications and performance data on utility blowers with backward curved blades are given in bulletin BC-11 (48 pages) — Hartzell Propeller

Vitroliner CHIMNEYS offer GREATER CHOICE





Builders, Architects and Home Buyers now have the choice of:

- **A beautiful factory finished solid flat grey chimney that harmonizes with all roof colors.**
- **A red or buff color brick effect chimney that looks like real brick.**
- **Our standard Vitroliner Chimney with a neutral grey rust proofing finish that can be painted on the job to match the roof color.**
- **Regardless of which you choose, all VITROLINERS retain the same time-tested basic design and engineered construction features that have made our chimneys the quality standard in the prefab field!**

Write for literature today.

THE PIONEER AND LEADER IN DESIGN AND QUALITY.

Designed for Easy Installation in lightweight sections. Space-saving features for ranch type homes. Engineered for long life and safety. LOWEST installation TIME.

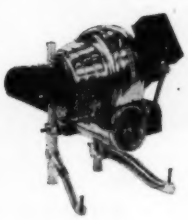
CONDENSATION
ENGINEERING CORPORATION
3511 W. POTOMAC AVE., CHICAGO 51, ILL.

Wisconsin BURNERS

MODEL Q

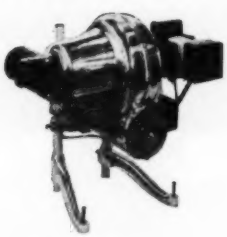
- A complete line. . .with Wisconsin Burners you can offer your customers a choice of 5 sizes. . . . from 0.65 G.P.H. to 25.00 G.P.H.

MODEL A

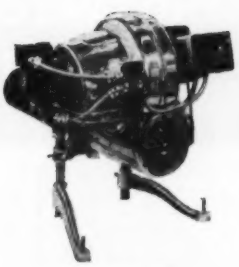


MODEL B-41

- Every Wisconsin Burner is factory tested under actual firing conditions. Their reputation for quality has made them a leader in the field.



MODEL B-51



MODEL B-61

- Available with the famous, efficient Shell Combustion Head.

FOR INFORMATION ON AVAILABLE TERRITORIES, WRITE

WISCONSIN OIL BURNER CO.

2720 EMIL ST. • MADISON 5, WISCONSIN

new literature

(Continued)

Fan Co., 1025 Roosevelt Ave., Piqua, O. Data is given for belt drive and direct drive models as well as for single width, single inlet and double width, double inlet blowers.

Insulating-Windows

INDEX NO. F11.2, *Insulating-Windows and Screens*, explains how double-glass windows can save fuel for an average home — Small Homes Council, University of Illinois, Urbana, Ill. (10 cents). The saving in fuel costs is only one of the benefits of insulating-windows, according to the Small Homes Council. Such windows, it says, can also reduce heat gain from outdoors in summer and reduce the size of an air conditioning plant required for the home. The folder is illustrated throughout with line drawings showing details of construction and installation procedures.

Packaged Air Conditioning Units

DATA ON PACKAGED residential air conditioning units is presented in bulletin C-1100-B59 (20 pages) — Worthington Corp., Harrison, N. J. A drawing illustrates how the unit cools in summer and heats in winter. Also contained are money-saving tips for prospective home owners which explain how planning for installation of air conditioning units in new homes can help minimize construction costs.

Year 'Round Air Conditioning

THREE BROCHURES are designed to explain the principles of year 'round air conditioning and heating systems — The Lennox Furnace Co., 200 S. 12th Ave., Marshalltown, Ia. Heating equipment — both gas and oil fired — is described in two of the booklets; the third, entitled *The Air We Live In*, covers year 'round air conditioning with emphasis on the company's "Perima-Flo" system.

Diffusers and Grilles

DATA ON REGISTERS, diffusers and grilles is presented in three four-page catalogs — Air-Factors, Inc., 1624 S. Raymond Ave., Monrovia, Calif. Catalog No. FB-104 covers "Flexi-Blade" forced air heating registers and grilles as well as registers designed for applications where evaporative cooling is used in conjunction with forced air heating. Catalog VC-105 includes information about opposed blade and "Multi-Volume" dampers and gives data on "AVP" air volume control units. Catalog ECCO-103 illustrates and describes ceiling air supply outlets for evaporative cooling systems.

Hard to believe, but true!

THE SHORTER THE CHIMNEY THE BETTER THE DRAFT

with the

quickdraft

DRAFT CREATOR

High chimney, high draft; low chimney, *no* draft? No longer true when QUICKDRAFT is installed on low-chimney installations typical with ranch type houses, one-story structures with suspended unit heaters, high input furnaces, boilers.

QUICKDRAFT creates all the draft you need without obstructing smokepipe or flue. Overcomes loss of static in long smokepipe runs and angles in chimney. Makes efficient firing possible by inducing sufficient combustion air. Can be cycled to create draft before firing begins for pre-purge and elimination of pulsation. Available for installation up to 5 million BTU input.

Get all the facts. You'll want to use QUICKDRAFT on your next job. Write for complete literature, installation manual and name of nearest jobber.

QUICKDRAFT COMPANY, Dept. F

1150 So. Erie Blvd. HAMILTON, OHIO

Majestic the line that helps to sell itself!

There's a Majestic matched year-round air conditioner for every requirement, whether it's a small home or a large commercial installation.

Completely automatic oil-or gas-fired units available from 76,000 to 400,000 BTU output . . . upflow, downflow, horizontal flow . . . with cooling units to match.

To make the Majestic line even more complete there's the famous Thulman Chimney with patented flue design that permits zero-clearance installation in one or two story homes because clearance from combustibles as required by the National Building Code is built in. This unit, which may be used with all fuels, can be quickly installed by one man.

And the Thulman fireplace is the packaged fireplace that's scientifically designed for controlled heat radiation. With the clearance built in, the Thulman fireplace is ideal for new construction or in remodeling . . . for use with any face material.

UL Labeled

To make your selling faster, easier and more profitable, Majestic sales helps are ready for your use. Write today for Majestic Bulletins—they'll show you how and why the Majestic name can mean more sales for you.

The Majestic Co., Inc

394 Erie Street, Huntington, Indiana

we hear that . . .

▸ THE CONTROLS SHOW developed by Penn Controls, Inc., for heating and air conditioning engineers and service men began its tour of 23 of the nation's cities February 28 in Little Rock, Ark. Features of the show include "live" demonstrator operating systems, wide screen color projection, animated charts and giant operating controls. Showings are sponsored in the various cities by wholesalers in the areas. On the schedule are: Amarillo, Texas, March 17; Oklahoma City, March 21; Tulsa, March 23; Springfield, Mo., March 25; Wichita, Kans., March 28; Kansas City, Mo., March 30; St. Louis, April 1; Evansville, Ind., April 4; Cincinnati, April 6; Dayton, April 7; Columbus, April 11; Toledo, April 13; Detroit, April 14; Jackson, Mich., April 18; Grand Rapids, April 20.

▸ MAJESTIC CO., INC. will hold its annual dealers' school and sales meeting March 17 to 18. The company will provide lunch, dinner and sleeping accommodations.

Don Winegardner, sales manager of the heating division, reports that many dealers using the company's emblem on uniforms and service garments find it to be an extremely effective and economical merchandising approach.

F. J. VAN POPPELEN (second from left), general manager of General Electric Co.'s Air Conditioning division, discusses merchandising plans for heating and cooling equipment with regional managers at the company's recent sales meeting

▸ THE AIR CONDITIONING division, General Electric Co., recently called in its entire staff of sales representatives for a three day marketing meeting at its headquarters in Bloomfield, N. J. Anticipating its biggest year for residential heating and cooling equipment, the division is gearing its distribution channels to handle accelerated production schedules.

The company reports nearly 100 cities will be visited this year by the application and service training teams of its Home Heating & Cooling Department. The train-

FALLSINGTON
Sheet Metal Machinery

DESIGNED FOR THE PRACTICAL SHEET METAL MAN

FALLSINGTON'S NEW BACK GEARED HUSKY PRESS

Here is Fallsington's new Back Geared Husky Press — similar to the Fallsington Husky Press except that it is of heavier construction and, instead of a belt drive, is chain and gear driven. The Fallsington Back Geared Husky Press is ideal for short and long runs and is particularly suited to the use of economy dies as used in the aircraft industry.

FALLSINGTON'S NEW 5' PIPE ROLLING MACHINE

The new Fallsington 5' Pipe Rolling Machine will roll pipe in one single operation without damage to the pipe or its locking device.

Pipes, 2' to 5' in length, 4" to 10" in diameter, of 30 to 26 gauge metal, can be rolled at the rate of 15 per minute.

This new time, labor and money-saver embodies the most modern aspects of machine tool building. It is easy to handle and occupies a minimum of floor space.

Literature will be sent on request to explain the operation of these two new Fallsington machines.

FALLSINGTON MANUFACTURING COMPANY

Manufacturers of Sheet Metal Machinery and Tools

FALLSINGTON PENNSYLVANIA

First Time Ever Offered

NEW "Positive Lock"

PIPE HANGERS

for ROUND PIPES

Eliminate old fashioned methods of hanging pipe on heating and cooling installations ... cut costs and do a neater job. Hangers available in Six Lengths, from 2¾" to 11".

PATENT PENDING

PIPE

PIPE

PIPE

AS LOW AS 2½¢ EACH

- Sharp prong pierces pipe
- Insert "Positive Lock"—tap in place
- Drive sharp prong into joist

Cam Action Assures "Positive Lock"

POSITIVE LOCK

IMPROVED SQUARE DUCT HANGER

With New "Positive Lock" cam action feature ... No Special Tools! Hammer does the Job! Available in six lengths.

PAT. NO. 2563242

DUCT

DUCT

DUCT

- Sharp prong pierces duct
- Insert "Positive Lock"—tap in place
- Drive sharp prong into joist

SEE your **SUPPLIER** *or WRITE* **for FREE samples**

TEST THEM YOURSELF ON THE JOB!

A. M. HEXDALL CO.

MORRIS, ILLINOIS

Manufacturers of Sheet Metal Specialties

ing staff has been increased 50 percent and the program considerably expanded. Open to dealers and distributors, classes average three days. The service part of the program is also being offered to independent servicers.

▸ APPROXIMATELY 1500 dealers and guests attended the recent series of two-day sales meetings held by the Lennox Furnace Co. at its Marshalltown, Ia., plant. Another meeting was held in Columbus and two more are scheduled — one in Toronto during the middle of April and another in Syracuse in the latter part of the same month.

A $250,000 tooling program is in process at the Syracuse plant to handle the production of new lines of gas fired heating and air conditioning equipment. The program, supervised by R. J. Seltzer, is expected to be completed in time for plant production of new designs by April 1.

The company recently launched a comprehensive advertising, promotion and merchandising campaign which includes advertising in consumer and trade publications on a national level supplemented by strong local dealer tie-in advertising in various media. The program will draw additional support from a broad schedule of direct mail and merchandising activities and a national program of sales promotion and publicity.

▸ A NEW DEALER INVENTORY protection plan — "DIP" — provides for payment as high as $250 for each new 1955 Westinghouse room air conditioner in dealer stocks as of September 15. "DIP" calls for the factory to set up a reserve for each room air conditioner it sells. The total of this reserve, as of September 15, 1955, is forecast at approximately $200,000. On that date the amount of money in the reserve will be divided by the national dealer inventory of that date to establish the per unit amount which is to be given to the dealer.

▸ THE SAMPSON CHEMICAL and Pigment Corp. recently equipped a 300-home housing development with electrical air purifiers for installation in the return air ducts of warm air heating systems. The units use Westinghouse ultraviolet lamps to destroy airborne germs and to control odors.

▸ ABOUT 100 heating dealers, area firemen and gas company officials attended a recent lecture on proper venting and incineration given at the offices of the Ohio Fuel Gas Co., Mansfield. Harry Donnelly, Akron

we hear that *(Continued)*

representative for the Metalbestos division of William Wallace Co., and John L. Harris, president of the Winnen Incinerator Co., were the speakers. Objective of the meeting, according to A. G. Earnshaw, president of the sponsoring firm, Earnshaw Sheet Metal Supply Co., was to attempt to standardize procedures for sales, installation and inspection of gas heating equipment.

▸ THE EXHIBIT of sheet metal tools and applications shown by Engel Sheet Metal Equipment, Inc., at the recent Heating and Ventilating Exposition attracted so many visitors that a number were unable to see the equipment in operation. The company says it will be pleased to send a field representative any place in the country to provide additional information about its products.

▸ KOLB REFRACTORIES CO., through modernization of plant facilities and the introduction of automation, has stepped up production schedules and tripled capacity.

▸ AIR-FACTORS, INC. has completed an addition providing approximately 12,000 sq ft of factory space. According to Frank McDonald, sales manager, increased demand for the company's products necessitated the expansion of manufacturing area and facilities.

▸ EIGHTY-FIVE of Trane Co.'s 260 field sales engineers recently attended the company's second annual engineering seminar at La Crosse, Wis. The three-day seminar is part of an educational program through which the sales organization is kept informed of new and improved company products, application of these products and industry trends.

▸ RUSSELL GRAY and Melvin C. Holm have been elected vice presidents of the Carrier Corp. Mr. Gray, associated with the air conditioning industry for more than 20 years, has been assistant general manager of the Unitary Equipment division and continues in that capacity. Mr. Holm will continue in his capacity as comptroller in addition to assuming other duties.

▸ RADIO CORPORATION OF AMERICA recently concluded a series of meetings with distributor principals in New York, Chicago, Dallas and Atlanta. Officials of the company explained the features of new flush-mounted window air conditioners and outlined the company's room air conditioner merchandising program. Austin Rising, general manager of the air conditioner department, looks forward to a 1955 sales

we hear that *(Continued)*

volume exceeding that of 1954. "Air conditioning is a growing business," he said. "Sales to consumers have increased every year since the industry's inception. And in 1954, the year that was called 'rough,' sales to consumers increased 15 percent over 1953. In the same year — 1954 — RCA's air conditioner business increased 30 percent."

▸ SHELDON COLEMAN, president and general manager of the Coleman Co., Inc., has been re-elected to the board of directors of the National Association of Manufacturers.

H. W. Faulkender

Thomas I. Byrd

Richard L. Perkins

▸ FIVE EXECUTIVES of the Lau Blower Co., together with a group of private investors, have purchased a substantial interest in the company from E. B. and Marion E. Lau. The executives are Harold W. Faulkender, who was elected president; Thomas I. Byrd, who became executive vice president; Richard L. Perkins, who was named secretary and assistant treasurer; Charles E. Hubbard, who became treasurer; and Joseph L. Lair, who was named assistant secretary. Each official has been associated with the company in an executive capacity for 15 years or longer.

▸ GENERAL CONTROLS CO. has moved its regional sales office and warehouse from Birmingham, Ala. to Atlanta, Ga. Address of the new facility is 1479 Spring St., N. W., Atlanta.

▸ MINNEAPOLIS-HONEYWELL REGULATOR CO. has established a new branch sales and engineering service office in Hammond, Ind., at 5719 Calumet Ave. O. V. Spousta, formerly manager of the company's Louisville branch, will manage the new office. Territory covered includes parts of Cook and DuPage counties, four other Illinois counties and two counties in Indiana, which formerly were served from the company's Chicago office.

▸ THE SUNDSTRAND HYDRAULIC division of Sundstrand Machine Tool Co. has moved into its new 106,000 sq ft plant at 2210 Harrison Ave., Rock-

we hear that *(Continued)*

ford, Ill. C. W. Lang, who has supervised sales of the company's fuel units for the past eight years, is sales manager of the division.

▸ DISTRIBUTORS and district office representatives of the Janitrol Heating and Air Conditioning division of Surface Combustion Corp. recently met for a four day sales conference conducted by H. C. Gurney, sales manager for the division. Features of new lines of heating equipment were explained by C. C. Owen and L. J. Monahan. E. H. Lloyd discussed horizontal summer air conditioners and other models of cooling equipment. One of the highlights of the meeting was the discussion of individual field distribution problems.

▸ THOMAS J. KELLEHER, who has been with Dreis & Krump Mfg. Co. for the past 45 years, retired from the firm effective January 1, 1955. Mr. Kelleher for many years was general sales manager and secretary of the company.

▸ H. G. HAYS, chief engineer of the Armstrong Furnace Co. was one of the instructors at the warm air heating short course given at Purdue University. Mr. Hays lectured on the addition of a cooling unit to an existing warm air heating system and explained how to lay out residential heating and cooling systems.

▸ A GROUP of 40 Wisconsin dealers recently was flown by chartered plane to the Columbus plant of the Armstrong Furnace Co. under the sponsorship of the Wisconsin Furnace Supply Corp. of Milwaukee while another group of 48 was brought in similarly by the Wisconsin Furnace Co. of Madison. Purpose in bringing the dealers to Columbus was to have them attend a sales and service school on heating and air conditioning, where they studied proper methods of installing, sizing and servicing of summer air conditioning and warm air furnaces.

▸ THE GRAYSON CONTROLS division, Robertshaw-Fulton Controls Co. is now in operation at its new plant located on the Long Beach Freeway, Long Beach, Calif. The new plant comprises some 237,000 sq ft of floor space, almost double that of the division's former location at Lynwood, Calif.

▸ A-P CONTROLS CORP. recently completed construction of a new plant at Nijmegen, Holland. The plant, with 18,000 sq ft of floor space and equipment, represents an investment of approximately $200,000.

appointments . . .

▸ RICHARD A. BIGGS as manager of product developments for the Stainless division, Crucible Steel Co. of America. Mr. Biggs was a pioneer in the development of a "sandwich" wall for curtain wall construction, produced in cooperation with basic material producers, fabricators and architectural teams. His office will be located in the Chrysler Bldg., New York.

Richard A. Biggs

M. A. Joulsohn

▸ M. A. JOULSOHN as vice president of the Torrington Mfg. Co. Mr. Joulsohn is also vice president and general manager of the company's western division, a wholly owned subsidiary at Van Nuys, Calif.

▸ JOHN E. HARRIS as manager of engineering for Viking Air Conditioning division, National Radiator Co. In his new position, Mr. Harris will coordinate and direct engineering and research activities in furnace blowers, blower packages, furnace humidifiers and attic and window fans. Previously, he was plant manager of the National Radiator Co. in Johnstown, Pa.

John E. Harris

J. C. Veltman

▸ J. C. VELTMAN as manager of branch sales for Iron Fireman Mfg. Co. Mr. Veltman has been with the company for 26 years and until his recent promotion was sales manager of the Chicago branch. In his new capacity, he will assume overall direction of sales in branches located in Chicago, Brooklyn, Milwaukee and St. Louis.

▸ A. M. HARP as general sales manager of the De-Bothezat Fans division, American Machine and Metals, Inc., succeeding C. J. Gaspar. Mr. Harp, who has re-

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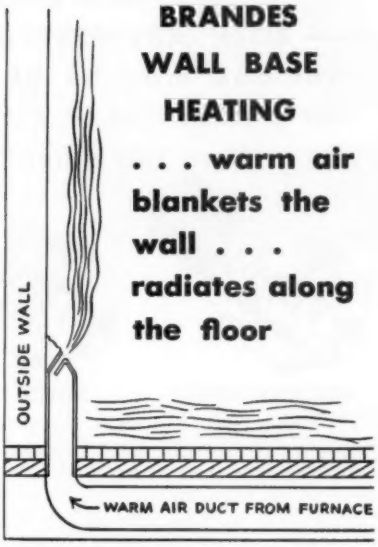
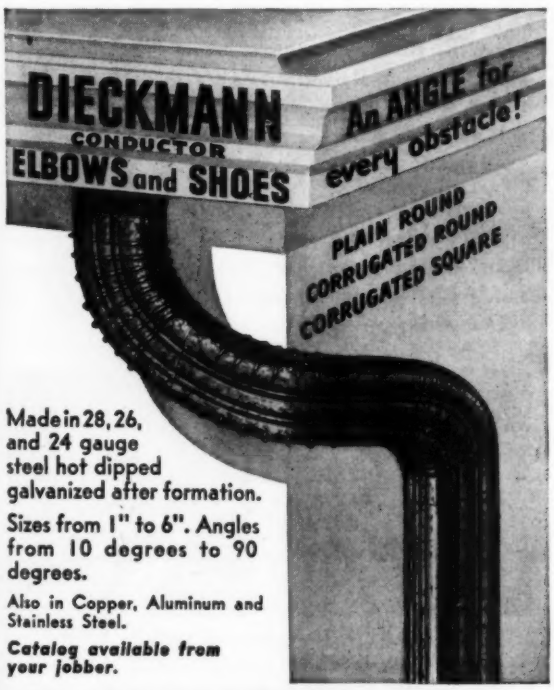
Patented
WALL BASE HEATING

Looks Better!
Heats Better!
Is Better!
BRANDES WALL BASE HEATING
. . . warm air blankets the wall . . . radiates along the floor





Made in 28, 26, and 24 gauge steel hot dipped galvanized after formation.

Sizes from 1" to 6". Angles from 10 degrees to 90 degrees.

Also in Copper, Aluminum and Stainless Steel.

Catalog available from your jobber.

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TIME SAVING
E-Z-ON
DAMPER REGULATORS
PERMIT
INSTANT ASSEMBLY

(Shown— head piece of #27 E-Z-ON)

It's the little things that make the Big difference!

Advanced design of E-Z-ON damper regulators permits on-the-job Assembly with only a hammer — no drilling — no rivets. This 16 gauge steel regulator is simply positioned on the damper by sliding it over the scribed center line. The E-Z-ON accurately stays in position until a hammer blow drives the sharp prongs through the damper (E-Z-ON prongs will pierce 22 gauge metal.)

E-Z-ONS PROVED MORE PROFITABLE

Job Histories prove that your apprentice or journeyman can save two-thirds of their damper makeup time with E-Z-ONS.

M. A. GERETT Corp.
724 W. Winnebago, Milwaukee, Wis.

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STYLE & SIZE
Famous E-Z-ON standard design No. 27
Solid end tail piece, threaded head piece and wing nut — 3/8" bearing.

Superior E-Z-ON "Snap-Tite" Design No. 29
Tail piece with retractable snap end bearing, threaded head piece and wing nut — 3/8" bearing.

appointments *(Continued)*

cently been vice president and general manager of Connecticut Telephone and Electric Co., previously served many years as the DeBothezat division's sales manager.

▸ GEORGE B. MCCLELLAN as sales promotion manager to head the newly-formed sales promotion department of William Wallace Co. Mr. McClellan, formerly western division manager, will direct promotion of "Metalbestos" gas vent pipe. George J. Torassa has been appointed to the New York sales staff of the Metalbestos division. He will operate from the company's New York offices at 120 Cedar St. Gerald L. Davies has been assigned to the division's sales staff to cover New Mexico, Arizona and western Texas. His headquarters will be in Santa Fe, N. Mex.

A. E. Hess

W. K. Walters

▸ A. E. HESS as southwest regional manager with headquarters in Dallas, Tex., for General Controls Co. W. K. Walters has been named regional manager of the company's branch office in Houston.

▸ AUGUST H. JAEGER, Seattle, as district manager for the Mitchell Mfg. Co. in Washington and Oregon. Prior to joining Mitchell, Mr. Jaeger was national manager of the water heater and utility divisions of the Hotpoint Co.

August H. Jaeger

Roland W. Bartlett

▸ ROLAND W. BARTLETT as manager of the Detroit district office for Worthington Corp. Mr. Bartlett's most recent post before going to the Detroit office was that of sales engineer in the company's Washington, D. C. district office where he handled government

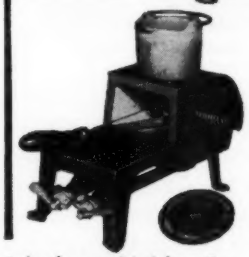
FASTER HEAT
LONGER FURNACE LIFE

JOHNSON No. 15
Melting-Pot Furnace

Melts its capacity of lead in less than 10 minutes. Has powerful No. 5 Type A Johnson Patented Direct Jet Bunsen Burner with shut-off valve; pilot light; very economical; takes hardest use. Ideal for all small quantity melting.

JOHNSON No. 105
Bench Furnace

Two-burner unit heats soldering coppers up to 12 pounds per pair. 3" dia. x 4" deep 10-lb. - capacity cast iron pot—for melting lead, babbit, tin, zinc, etc.—fits in hood when lid is removed.



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NOW! an all-in-one unit for HOME disposal of

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WASTE BASKET TRASH

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For complete indoor disposal of trash and garbage, Majestic makes a full line of home incinerators — from low-cost basement units that use the waste itself as fuel, to the gleaming, automatic, gas-fired model illustrated. A modern "convenience" feature that home-buyers are demanding!

See your distributor or have him write:

The Majestic Co., Inc.
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Majestic INCINERATOR

MIPATAN
Pittsburghlock ELECTRIC HAMMER

- Goes with you on the job
- Turns the flange on a Pittsburghlock
- Turns 30 Gauge through 24 gauge
- 25 feet per minute
- Perfectly balanced — weight is on the work
- Handle designed to fit hand
- No springs — special patented air shock in shuttle
- Plugs into any 110 volt AC DC current outlet
- Cam Driven
- *Not* eccentric
- Smooth — finished work looks rolled
- Fast — pays for itself in a short time

Canadian Dealers and Jobbers Inquire of Brown Boggs Company Limited, Hamilton, Ontario

GIBSON INDUSTRIES

965 W. Western Ave. Muskegon, Michigan

W. A. WHITNEY LEVER PUNCHES

For Every Shop and Tool Box

Also supplied with three punches and three dies in a cardboard carton

No. 4B Punch
All parts drop-forged.
Most sturdy punch built for size.
Capacity — ¼" hole through 16 gauge metal
Length — 8½" Depth of throat — 2"
Weight — 3 lbs. Stock size punches 1/16" to 9/32" by 64ths.
Write for catalog — then contact your jobber.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD ILL

appointments *(Continued)*

accounts, utilities and export business. Andrew F. Ward has been named sales manager of packaged products in the corporation's air conditioning and refrigeration division. In his new position, Mr. Ward will direct the activities of the distributor-development group and product section managers of packaged residential air conditioning products.

▸ S. J. GRIMM as manager of the Evansville sales branch for Servel, Inc. Mr. Grimm joined the company in 1946. He succeeds L. J. Hadley, who resigned last August to accept a position with the Servel distributor in Atlanta. Ferd Laux, who has been acting branch manager for the past five months, has been given a special assignment in the company's southwestern region, with headquarters in Dallas.

▸ DAVID E. JOHNSON as sales manager of Cronstroms Mfg., Inc. Mr. Johnson was formerly associated with Cosom Industries, Inc. of Minneapolis as sales manager.

▸ BOBART SHEET METAL SUPPLY CO., Inc. as wholesaler of automatic heating and air conditioning equipment in the central New York area for the Heil Co. Headquarters of the Bobart company are at 405 Hickory St., Syracuse, N. Y.

▸ KENNETH O. DUPREE as general sales manager for Magic Chef, Inc., succeeding Marc W. Pender. Mr. Dupree jointed the company in 1937 as a sales representative in the Carolina territory and has been sales manager of the southeastern division since 1945.

Kenneth O. Dupree

Robert J. Callahan

▸ ROBERT J. CALLAHAN as district sales manager for the Century Engineering Corp. in the Cleveland-Pittsburgh area. Mr. Callahan's territory will include parts of Ohio, Pennsylvania and West Virginia. Previously he was associated with Famous Furnace Co. and before that with Decker-Reichert Steel Co.

appointments *(Continued)*

NEW COOLING sales engineers of the Sunbeam Air Conditioner division of American Radiator & Standard Sanitary Corp. Top row (*from left*) H. I. Dingle, Maurice G. Nelson, T. J. Conway, C. E. Johnson, Robert T. Watt. Middle row (*from left*) John B. Mitchell, W. D. Campbell, Lester G. Simpson, James I. Bickley. In the front row are company officials (*from left*) W. G. Senft, product manager; F. P. Weil, vice president in charge of manufacturing; and W. W. Woodroof, manager of cooling sales

▸ JAMES I. BICKLEY, Landover, Md., as sales engineer covering the Baltimore-Washington, Philadelphia and Richmond territory for the Sunbeam Air Conditioner division of the American Radiator & Standard Sanitary Corp. Other new sales engineers and their territories are: W. D. Campbell to handle the Pittsburgh, Buffalo and tri-state territory; H. I. Dingle to serve in Texas; C. E. Johnson to cover the Chicago, Wisconsin, Illinois, Minnesota and Omaha area; T. J. Conway, who will serve St. Louis and Kansas City; Maurice G. Nelson, who will cover Cincinnati, Cleveland, Detroit and Ohio; John B. Mitchell, whose territory includes Boston, New York and Newark; Lester G. Simpson, who will handle the New Orleans area; and Robert T. Watt, who will cover Atlanta.

▸ ARNOLD CHALLMAN, for the past four years manager of the Peoria branch of Minneapolis-Honeywell Regulator Co., as administrative assistant to T. S. Carley in the company's regional sales and service office in Chicago. R. C. Ferguson, formerly manager of the district sales office in Davenport, will manage the Peoria branch, and R. R. Scott, former regional sales manager for the company's valve division in Chicago, has been named to head the Davenport office.

▸ CHARLES H. ROSE as branch manager of the new Houston factory branch of Payne Furnace division, Affiliated Gas Equipment, Inc. Formerly sales manager of the Home Comfort division of Joe Thiele, Inc.,

appointments *(Continued)*

Mr. Rose has had over five years' experience in the heating and air conditioning industry.

▶ PERLEY F. BETTS as sales representative in Idaho, Oregon and Washington for Inland Steel Products Co. Richard J. Shelton has been appointed sales engineer to cover the state of New York (except the metropolitan area of New York City) and four counties in Pennsylvania.

Perley F. Betts

Chesley Somerton

▶ CHESLEY SOMERTON as assistant sales manager of the Wales-Strippit Corp. Mr. Somerton was formerly with Wales-Strippit of Canada, Ltd., where he was a sales engineer in the southwestern Ontario area.

Classified Advertising

Rates for classified advertising are 12 cents for each word, including heading and address. One inch $6.00. Count nine words for keyed address. Minimum $2.00.

situation open . . .

Experienced plumbing and heating road salesman wanted to call on plumbing and heating and forced warm air contractors. Address Key 986, American Artisan, 6 North Michigan Avenue, Chicago 2, Ill.

agents wanted . . .

AGENTS WANTED: Manufacturers' representatives wanted by old established company, AAA-1 rated, in business for over ninety years. Manufacturing a complete line of Coal, Oil and Gas Furnaces, Incinerators, Radiant heat Gas Conversion Burners, High and Low Pressure Conversion Oil Burners, and Stokers. In answering, give your territory and background in this business or allied businesses. FREEMAN HEATING DIVISION, ILLINOIS IRON & BOLT COMPANY, 914 So. Michigan Avenue, Chicago 5, Illinois. Phone WE 9-5353.

situation wanted . . .

SALES ENGINEERING and system design work desired in residential warm air heating and cooling. Experience: 2-½ years of field testing; all types of systems. Married, 25. Available May, 1955. Not afraid of work. Address Key 988, American Artisan, 6 North Michigan Avenue, Chicago 2, Ill.

business opportunities . . .

FOR SALE — Sheet metal and warm air heating shop in central Illinois established 30 years. 2 trucks, tools, stock and good will. Address Key 985, American Artisan, 6 North Michigan Avenue, Chicago 2, Ill.

FOR SALE — Heating, Air Conditioning, Roofing, Sheet Metal business. Wholesale and retail. Over $200,000 volume last year can be doubled. Indiana. Est. 35 years. Fine bldg., equipment and lines. Other interests. Address Key 989, American Artisan, 6 North Michigan Avenue, Chicago 2, Ill.

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To avoid missing any issue of *American Artisan* it is more important than ever to report both your new and old address to us and your post office. Deadline is the 18th of the preceding month for the next issue. Send changes — and new local postal delivery zone — to

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Rates for display space in the Service Section are $12.00 per inch per insertion. One-inch minimum space accepted. Closing date — twentieth of the month preceding issue.

This section represents an ideal opportunity for manufacturers to get their messages across to readers of a national publication in their field. Whatever you make or sell, you'll find a large, receptive audience, easily reached at a minimum outlay. Plan now to move your products quickly and economically with consistent advertisements in this section.

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Drive Cleat Notcher

Handles up to 3" wide, 22 ga. or lighter. Hand or foot operation. Mounts on bench, or on job with clamps, or bolts and screws.

New Clip Punch

For fastening slips or seams on ducts. Will push a "half moon" through 3 thicknesses of 18-ga. steel. No hammering or flattening out to fasten slip to the duct.

Quick Set Dividers

Fastest and most accurate on the market. Two sizes for circles up to 36" and 48". Removable steel points, or pencil. No center punch.

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Lockformer Machines	Peer Spot Welders
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Chicago Press Brakes	Wysong Shears
Pexto Power Shears	Whitney Punches
Pexto Foot Shears	Whitney Foot Presses
Pexto Rotary Machines	Pexto Mechanic's Tools
Pexto Slip Rolls	Black & Decker Tools
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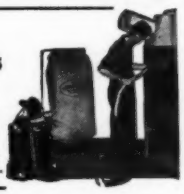

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Registers and Grilles
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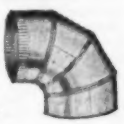

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72-15 Metropolitan Ave.
Middle Village, L.I., N.Y.

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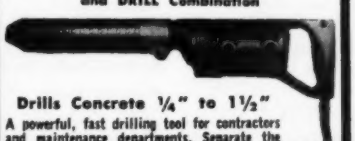

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A powerful, fast drilling tool for contractors and maintenance departments. Separate the two members and it's a heavy duty ¾" electric drill. TWO TOOLS IN ONE. Star drills in 20 diameters and 20 other hammer tools for chipping, grooving, etc. Saves man hours. Speeds up work — 12 to 15 times faster than with hand tools. Ask for the New Bulletin 510-AA

ASK FOR BULLETIN 510-AA

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4627 W. Huron St. Chicago 44, Ill.

NEW PRESS BRAKE DIES for FABRICATION of METAL DUCTS

Announcing a complete newly designed line of dies that speed production for ventilation shops, with press brakes. Forming of Standing Seams, Clinch Collars, Bar or "S" Slips, Pittsburgh Locks, Government Lock Slips or Multi-Gang Punching is completed in one handling of materials, therefore, cutting shop fabrication costs. Satisfied customers from coast to coast have found that these dies have paid for themselves in a very short time. Made of 90 carbon forged chisel steel and fully guaranteed, these dies are a real necessity to the progressive ventilation shop. Literature on request.

HARDCO PRODUCTS
3624 Jerusalem Ave. Wantagh, N.Y.

INDEX TO ADVERTISERS

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in other issues is marked with an asterisk.

UNARCO

ROYAL-AIRE *a distinctive conditioner*

featuring UNARCO "pump-down" control system

It is doubtful that any air conditioner can match the efficiency and beauty of the UNARCO ROYAL-AIRE. This all-new conditioner provides "just right" cooling comfort, adding distinction to *any* setting.

Oversize cooling coils . . . accessible, hermetic motor-compressor units... and the exclusive UNARCO "pump-down" control system, which prevents compressor damage... are but a few outstanding features of the ROYAL-AIRE line.

Available in five capacities (3 to 15-ton) the ROYAL-AIRE is *balance-engineered!* This insures full cooling capacities and quiet operation under all conditions, producing a pleasurable climate and atmosphere for any size room.

The ROYAL-AIRE is eminently suited to comfort-cool dining rooms, taverns, drug stores, clothing stores, and offices... to cool wherever the *ultimate* in efficiency and long life is desired. Address Heating & Cooling Division for descriptive literature.

Union Asbestos & Rubber Company
332 So. Michigan Ave., Chicago 4, Ill.
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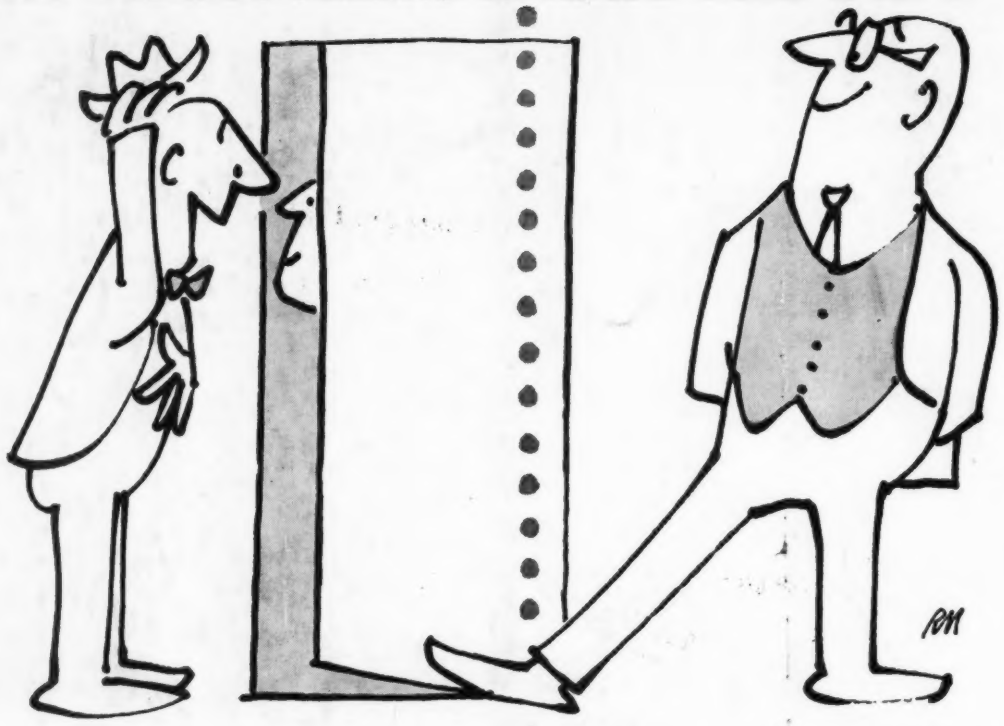
UNARCO

the *finest* in heating and cooling products *at no extra cost*



It's great to be a Carrier Home Weathermaker* Dealer!

Because Carrier Distributors are extra helpful!

None of our Carrier Distributors would ever really slip a foot in a prospect's door; they're much better salesmen than that! Take the job they did this past fall selling Weathermakers to replace antiquated furnaces! Carrier Dealers developed calluses from ringing up record sales and new muscles from counting the cash! And that's because . . .

Carrier Distributors know air conditioning!

These men grew up in the air conditioning business! Twenty-five of them have been associated with Carrier for more than twenty years! They're the industry's most experienced air conditioning distributors! In the home air conditioning business, you just couldn't find stronger support anywhere. Besides . . .

You have the Carrier name to sell!

Carrier doesn't make light bulbs, TV sets or phonograph records—just air conditioning! They are the people who know air conditioning best! And Carrier Weathermaker Home Air Conditioners prove it—by selling best! More new air conditioned homes are equipped with Carrier Weathermakers than with any other make.

Like to get in the act? Your Carrier Distributor has a great course in home air conditioning for you . . . estimating, sales, design, application and installation! Better enroll right away!

Mail coupon! Learn Home Air Conditioning!

LOOK WHAT YOU GET FROM THE CARRIER DISTRIBUTOR!

- **A special course: "How to Get Started in Home Air Conditioning!"**
- **A special "Starter Package" to identify you as a Carrier Dealer!**
- **Financing and warehousing plans to ease your inventory problems!**
- **Four retail financing plans designed to make payments painless!**
- **Sales, advertising and engineering assistance when you need it!**

LOOK AT THE WEATHERMAKERS YOU HAVE TO SELL!

The Carrier Year-round Weathermaker is illustrated below. It heats and cools the whole house. It burns gas or oil; it is available in air-cooled and water-cooled models. Other air-cooled Weathermakers add onto any existing warm air system, install independently of wet heat systems. Together they make up the industry's best-selling line of home air conditioners!

*Reg. U.S. Pat. Off.

Carrier AIR CONDITIONING • REFRIGERATION • INDUSTRIAL HEATING

CARRIER CORPORATION, 308 S. Geddes Street, Syracuse, New York

Please put me in touch with the Carrier Distributor who can enroll me in that Home Air Conditioning Course.

I'd be interested in selling:
☐ Carrier Self-contained Weathermakers ☐ Carrier Residential Weathermakers ☐ Carrier System Weathermakers ☐ Carrier Room Air Conditioners ☐ Carrier Icemakers

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